MAR. 18 1960

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

U.S. liquid hydrocarbons reserves rise 4.1% to peak of 38.2-billion bbl. 15

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Training is key to blowout control 37

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Product lines outlook: Another good decade 54

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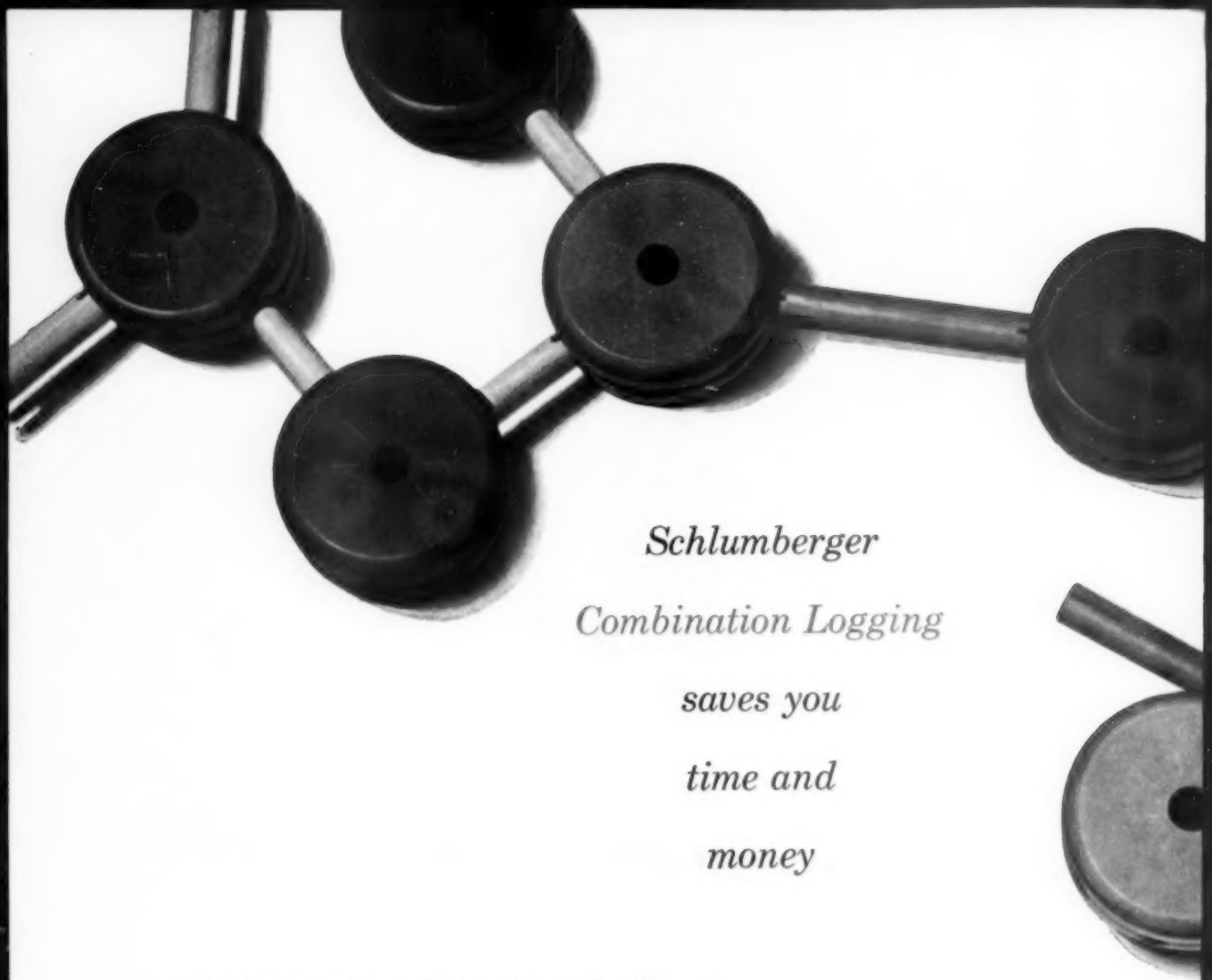

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INSIDE *Slant*

IT'S HARD TO BELIEVE

Will wonders never cease?

A major company, long on crude, has offered to sell part of its imports quota.

Another way of handling the oversupply situation would be not to bring in the foreign crude. But that might have been too simple a method.

Then, too, it might be an admission on the part of the company involved that it was getting too much foreign crude as well as too much domestic oil.

And, speaking of domestic crude, it's also unusual that the majority of companies that have consistently sought high state allowables are trying to sell their surpluses on the spot market.

Could it be that their desire to produce more of their own oil is influencing their over-all policy?

At any rate, something is wrong when companies ask for higher allowables, then immediately go into the spot market and try to sell their surpluses.

Either they need the oil or they don't.

They're not kidding anyone but themselves when they ask for too much. At the same time, they're doing damage to the industry.

LeRoy Menzing
EDITOR

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DEPT/Opinions

Views That Make News . . .

"It is the industry itself that refines more oil than can be sold. Why the industry does this is beyond my ken."

—Ernest O. Thompson
Chairman
Texas Railroad Commission

"Every one of us has at one time or another bought something at a special bargain price, saving some money over and above what we would have had to pay by buying the same item at the store where we usually traded—and then when the item went sour, have found that we were 'out on a limb' as far as recourse went. The smooth-talking salesman who had sold us the bargain had disappeared, and there we were, stuck with a no-good piece of goods. Too late we discover that the apparent lowest price is sometimes the most costly."

—H. R. Safford, Jr.
Executive vice-president
Petroleum Equipment Suppliers Assn.

"Thanks to the income tax, the government is in effect a partner in every business enterprise. Not only does the government share in the profits of every business, which I think gives business ample right to be concerned with what government does with the money; but, as we all know from experience, the welfare of our companies is dependent upon innumerable government decisions, rulings, and actions. These things all involve politics in some degree."

—Harold S. Skinner
Ass't. to the president and director of public affairs
Continental Oil Co.

"Since 1941, corrugated board has jumped from 1¢ to 2.1¢ while styrene has dropped from 5.5¢ to corrugated's present price. Similarly urethane cost has declined from 5.5¢ to 3.2¢, and will probably cross the upward trend of corrugated this year or next.

"However, all is not bright in plastic packaging. There is reason to believe that vendors of expanded and foamed plastics are boosting profits by using more of the new materials than is needed to do a given job. This 'fast-dollar' is no way to build for the future. Even now, it may be losing vendors 75% of their potential volume."

—Richard H. Thomas
Senior engineer
Packaging laboratory
General Electric Co.

"We look forward in 1960 to an upward trend in the rate of new orders and general improvement in capital goods industries, but with mounting pressures on profit margins."

—P. T. Egbert
Chairman
Alco Products, Inc.

. . . and Letters

Dear Sir:

Your attention is directed to the article entitled "Octanes Adjusted to the Weather" [PW—Feb.19'60,p70]. In the second paragraph it is stated: "This is the result of extensive studies that have been carried out over a period of many years by Standard Oil Co. (Ohio) in cooperation with General Motors Corp."

This statement is not correct, in that we did not carry out a cooperative program with General Motors. The paper referred to in this article is "Seasonal Octane Control," co-authored by Dr. F. J. Sanders and myself of Standard Oil Co. (Ohio). In this paper reference is made to an earlier SAE paper entitled "Weather or Knock"; this paper was co-authored by Ethyl Corp. and Standard Oil Co. (Ohio). This earlier paper was, in part, a basis for the latter paper.

In discussion of the "Weather or Knock" paper, General Motors presented data based on its own studies that supported some of our earlier findings. This data is referred to in the "Seasonal Octane Control" paper, and is probably where the writer might have been misled.

E. H. Scott
Manufacturing department
Standard Oil Co. (Ohio)

Dear Sir:

Your piece on "Pure Hydrogen By Diffusion" [PW—Feb.26'60,p41] was interesting enough, but I'm afraid that palladium in the presence of hydrogen doesn't become a brittle impervious isotope. Palladium and β-palladium aren't isotopes, but rather a different metallurgical phase—quite a difference. Isotopes have different nuclear structures (atomic weight difference). Crystalline phases differ only in their crystalline structure.

Martin D. Robbins
San Francisco, Calif.

Petroleum Week will publish reader comments each week. Address letters to LeRoy Menzing, Editor, Petroleum Week, 330 W. 42nd St., New York 36, N. Y.

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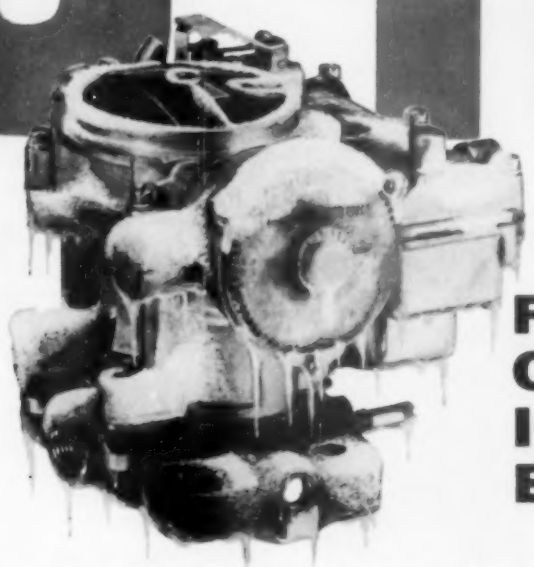

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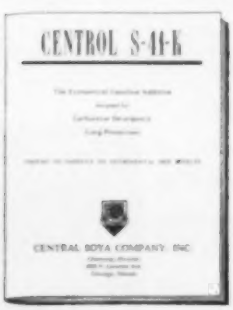

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Lewis Yates, owner of the Yates Drilling Company, Lafayette, La., has proved to himself through his operating records that Edward Mudwonder valves are saving him real dollars. He says:

"Actual accounting records on our Rig #1 prove a point I have always believed to be true. The real savings on a mud valve is the money you don't have to spend to keep it in good operating condition. Checking the cost record for Mudwonder mud valves on our #1 rig showed that these valves have required the bare minimum investment in replacement parts. When such is the case, we can give top service to our customers without excessive investment in capital equipment and supplies.

"In short, Mudwonder valves help us keep our costs down due to less maintenance and less repair parts and, naturally, less down time."

The confidence Lewis Yates has in Mudwonder valves is found wherever you go in the drilling fields. Mudwonder valves are built to 2", 3" and 4" sizes, with screwed or flanged ends, for 2000 psi WP (4000 psi test), 3000 psi WP (6000 psi test) and in 2" size for 5000 psi WP (10,000 psi test) service. See your favorite oil field supply store, or write Edward Valves, Inc., 1236 W. 145th Street, East Chicago, Indiana. Subsidiary of Rockwell Manufacturing Company.

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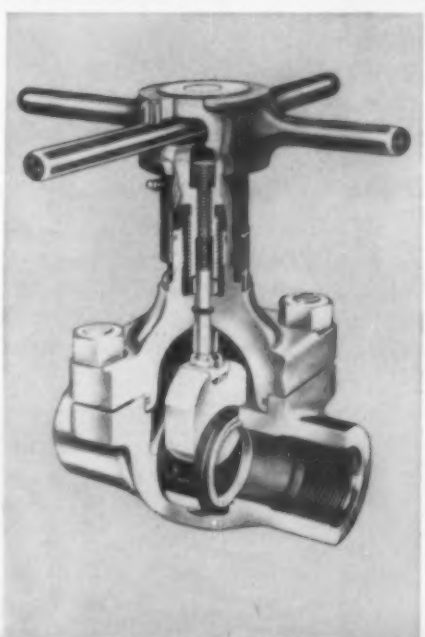
▲ Lewis Yates, owner of the Yates Drilling Company, has found from his own accounting records that Edward Mudwonder valves save him money in maintenance and down time costs.



◀ Mudwonder cut-away view shows the one-piece seat insert with Buna-N molded integrally over steel wear rings; chromed gate with "T" slot connection; separated stainless stem and double thread construction.

Good Wells Make Good News

A Report on Recent Engineered Acid Treatments

March 18, 1960

Dowell engineers can now use more proved services, products and techniques than ever before to design effective acid treatments. Here are four recent treatments that used advanced engineering to good effect.

- **Spencer County, Indiana** (New Oil Well) This well made a show of oil upon completion into the Rosiclare. The pay is a dirty lime. Dowell recommended acidizing with 3000 gallons inhibited acid. Two Dowell addition agents were used to prevent emulsions and control silicate swelling. Injection rate was held to 1.5 bpm during treatment. 30 days after treatment well tested 95 bopd with no water — an unusually good well for the area.

- **Central Alberta, Canada** (New Oil Well) This well was completed in the Slave Point formation on the edge of a pool in the Swan Hills region. The pay is a fast-reacting limestone. There was no production and the operator considered abandonment. Dowell engineered a treatment using the "Acid Guide"*. The formation was washed 4 hours with 500 gallons Mud Acid. Then 500 gallons Retarded Acid was squeezed into the formation at one bpm and 3800 psi. After treatment, the well made field allowable and was put on production.

- **Eastland County, North Texas** (New Oil Well) This well went to water after conventional perforating and acidizing. The operator squeezed with Cealment*, latex-cementing service; then used Abrasijet*, abrasive-fluid jetting service, to re-perforate into the Marble Falls conglomerate from 2955 to 2968 feet. Next, 250 gallons Dowell acid were jetted into the formation through the tool used in Abrasijet. Before treatment, well produced 100 per cent water. After treatment, it produced 25 bopd with no water.

- **Lea County, New Mexico** (Old Oil Well) This well had depleted the McKee sand and was plugged back and re-completed in the Abo limestone from 7122 to 7226 feet. Core analysis showed iron compounds to be present. Dowell recommended Stabilized Acid to prevent the possible precipitation of gummy iron hydroxides. 6000 gallons Stabilized Acid were injected. Perforation ball sealers were used during treatment. Production increased from a show to 200 bopd (with no water) through a 20/64th-inch choke.

Engineered acidizing by Dowell helps you improve profits by getting maximum return from your acidizing dollar. For service or detailed information, contact the Dowell office or station nearest you. Dowell services and products are offered from more than 150 locations in the United States, Canada, Venezuela, and Argentina. Dowell, Tulsa 1, Oklahoma.

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60-Second Summary / WHAT'S HAPPENING IN OIL

March 18, 1960

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Producers are still trying for gas legislation that would exempt them from federal controls. But they would offer consumer safeguards on prices. . . . p. 20

•

Around 30% of all hard-rock drilling will be with air or gas by the end of 1962. That's the forecast of a contractor, optimistic because of improvements in air drilling. . . . p. 30

•

Product pipelines will grow steadily during the current decade, with sharp gains in throughput. Liquefied petroleum gas movement by pipeline promises to pace the major gains in the near future. . . . p. 54

•

Use of scale models is helping lower costs for transporters planning new installations. The models point up any costly design errors before building starts. . . . p. 49

•

An on-stream titrator is simplifying control of sweetening operations in refineries. It measures mercaptans and other sulfur compounds in the oil stream. . . . p. 73

•

Synthetic rubber manufacturers have a new problem: too much progress. New polymer techniques are being developed so fast they're outdating rubber plants in existence. . . . p. 68

•

Training will lead to the most effective blowout prevention and control. That's the view two Gulf Oil Corp. engineers presented this week at an API production meeting. . . . p. 37

•

Tidewater Oil Co. is marching south in its drive to expand East Coast markets. The company has already considerably strengthened and enlarged its retail outlets. . . . p. 88

•

The move abroad by French government-controlled companies has now reached Greece. Regie Autonome des Petroles is wrapping up negotiations for a joint venture in eastern Thrace. . . . p. 78

•

Pan American International is getting ready to drill its second Persian Gulf wildcat. It will test the southeast corner of the firm's big offshore Iranian tract. . . . p. 79

•

U. S. reserves of liquid hydrocarbons increased 4.1% last year to a new high of 38.2-billion bbl. It was the largest gain since 1951. Reserves of natural gas also hit a new peak (page 17). **Revisions of earlier estimates accounted for most of the gains in 1959.** . . . p. 15

Up to the Minute / SIGNIFICANT LATE NEWS

March 18, 1960

Texas' crude allowable will be based on a nine-day producing schedule in April, the pattern that prevailed for most of the last half of 1959. The Railroad Commission set the initial allowable at 2,814,252 b/d, a cut of 123,029 b/d from the mid-March permissible. In addition, 594,000 b/d of gas liquids will be produced in April.

A majority of the purchasers requested a cut to eight days. Humble Oil & Refining recommended ten and Indiana Oil Purchasing, which is now prorating its purchases nationwide, asked for only seven.

Texas conservation officials are becoming concerned over the impact of production in other states. In reply to questions by the commissioners, most of the buyers, who also buy in Louisiana, said producing schedules there were higher than they wanted. Commissioner Olin Culberson said that he was trying to "bring out that Louisiana is not toting fair."

The state officials also criticized companies seeking higher import quotas. Under questioning, John R. Evans, general manager of production for Indiana Standard, said his company was seeking an increase in import quotas which, if granted, "would supplant crude from the U.S." Asked what is the "urge" to import, Evans replied: "The urge is simply that it can be laid down in the U.S. cheaper than domestic oil."

Estimates of "ample" inventories submitted by the major companies were generally questioned by the Texas officials. Commissioner William Murray said the product stock figures submitted failed to reflect the surplus inventories.

•

Two of the firms most actively involved in fuel-cell research will pool their knowledge. Esso Research & Engineering Co. and Allis-Chalmers Manufacturing Co. have agreed to exchange information leading to the development of practical fuel cells. Both companies are working on hydrocarbon fuel cells. Allis-Chalmers has developed a fuel-cell-powered tractor, fueled by propane.

•

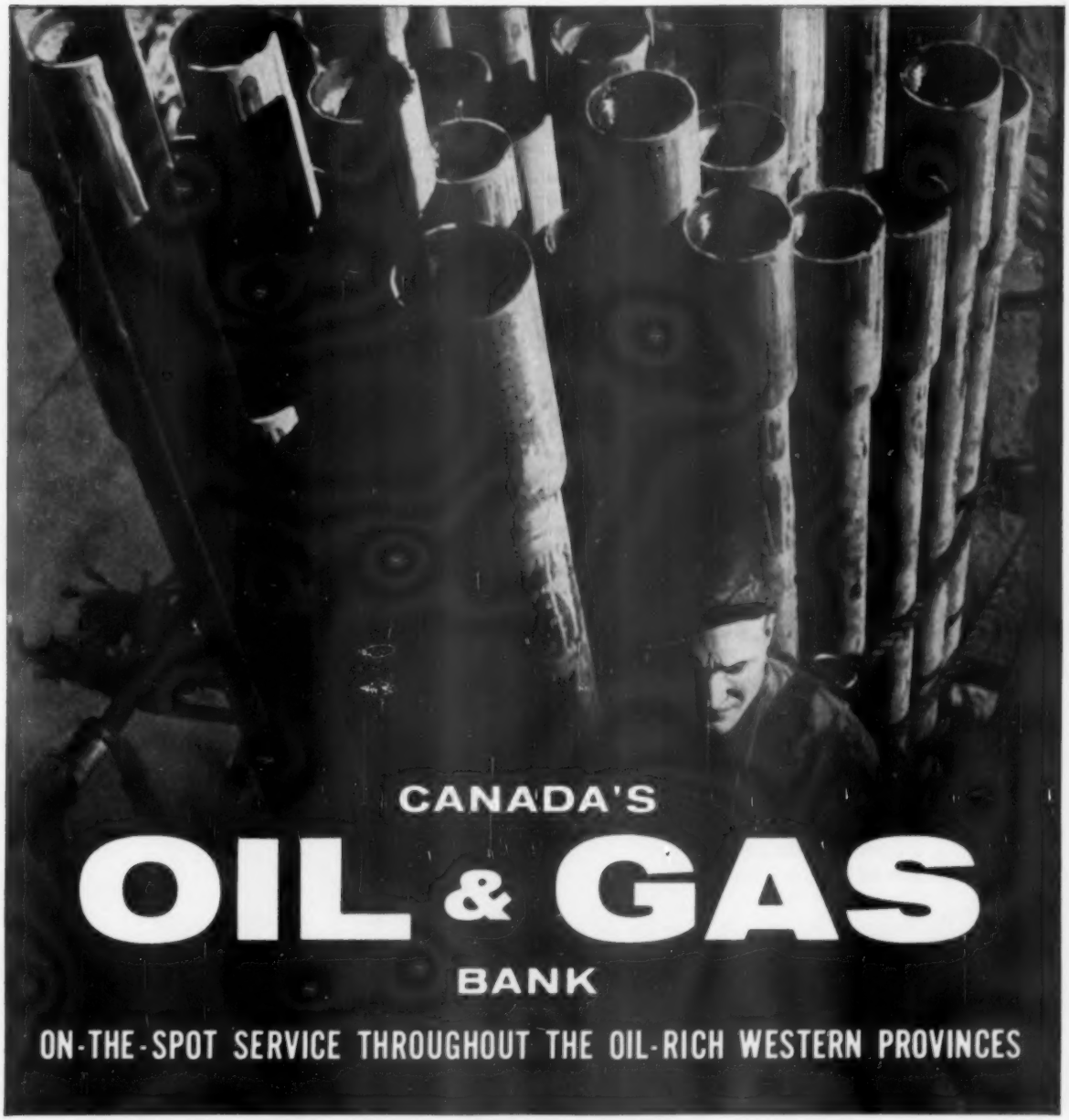
A second discovery, or an important extension of Alaska's Swanson River field, was indicated this week. Standard Oil Co. of California and Richfield Oil Co. No. 41-4 Soldotna Creek Unit tested at the rate of 1,870 b/d through ½-in. choke for "a very brief period." It was drilled to 11,315 ft., and tests are still being conducted at 10,228-585 ft. in the Hemlock. The location is 2 mi. south of nearest Swanson River production.

•

State Dept. officials will discuss trade problems, including oil import controls, with Venezuelan leaders in Caracas next week. The U.S. requested the conference to iron out trade restrictions recently imposed by Venezuela against some U.S. items.

•

The successful use of radiation in the processing of polyethylene was claimed this week by W. R. Grace & Co. scientists. Their irradiation technique, which is said to strengthen polyethylene film five-fold, marks one of the few successful ventures thus far in the radiation-chemistry field.



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A list of current Oil and Gas bulletins covering regulations, tariffs, financing, statistics and kindred subjects pertaining to the Canadian industry is available on request. Write The Royal Bank of Canada, Oil and Gas Department, 409 Eighth Ave. W., Calgary, Alta.

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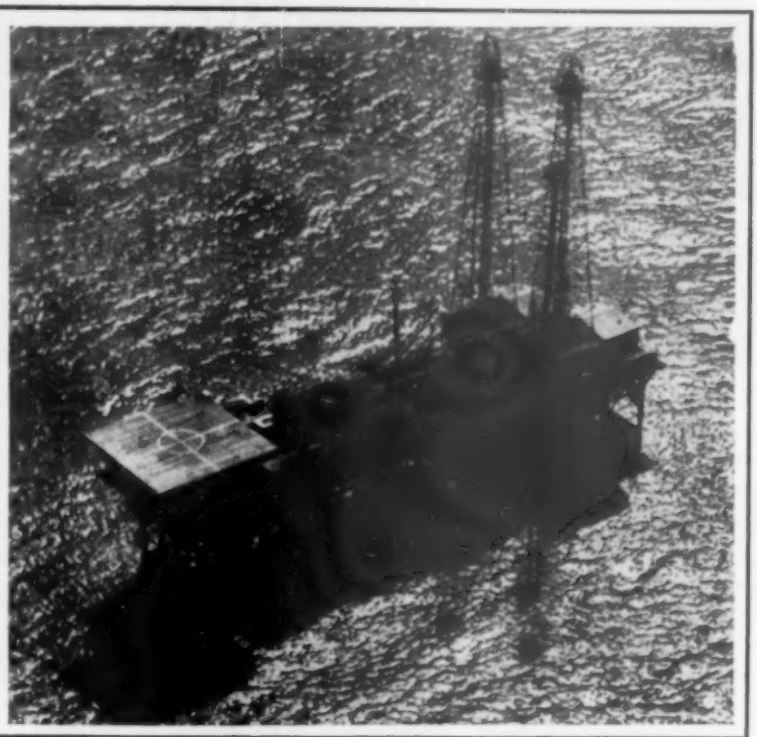
Concentrated Peladow will form stable brines of much higher densities than are possible with sea water or sodium chloride—thus suiting them for use in high pressure as well as low pressure wells. Such brines are regularly used at densities up to 11.6 pounds per gallon. Even higher densities are easily obtainable with combinations of Peladow and other inorganic salts.

There's an informative brochure available entitled "Peladow Calcium Chloride For Oil Well Completion Brines" that is full of detailed information on this cost-saving material. Write for your copy.



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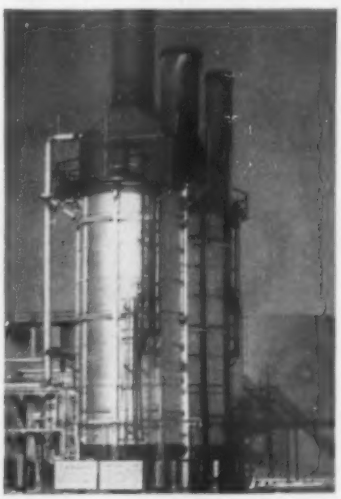

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Domestic Reserves Hit New Record

- **Total liquid hydrocarbons rose by 1.5-billion bbl. in 1959 to 38.2-billion, the largest gain since '51.**
- **Reserves added by discoveries increased some, but their ratio to total reserves added declined.**

Net additions to U.S. reserves of liquid hydrocarbons last year were the largest since 1951. But reserves found by drilling accounted for the smallest percentage of the total added for any year since 1951.

Total reserves of crude and natural gas liquids rose 1.5-billion bbl., or 4.1%, to a new peak of 38,241,655,000 bbl. at the end of 1959, according to the report of the Joint Committee on Reserves of the American Petroleum Institute and the American Gas Assn. (tables, page 16).

Crude reserves were estimated by the API committee, while gas liquids reserves were compiled by the committees of both groups. The AGA committee also estimated natural gas reserves (page 17).

This marked the second consecutive annual net gain in reserves, after production—following a 134-million-bbl. decline in reserves in 1957. Except for that decline and a minor dip in 1943, there have been steady increases in U.S. reserves since 1936.

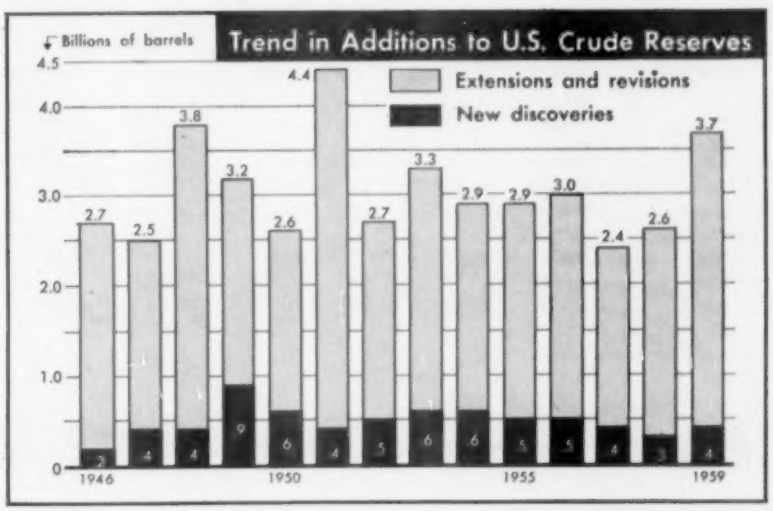
The nation lost a little ground in 1959, though, on the ratio of reserves at the end of the year to annual production.

The so-called "years' supply" at the end of last year amounted to 13.3 years of liquid hydrocarbons, compared to 13.5 at the end of 1958. Annual production last year was 2,868,469,000 bbl., up 5.7%.

The figures include both "proved drilled reserves" and "proved undrilled reserves."

The proved drilled reserves include liquids estimated to be recoverable by the production methods currently in operation from the area actually drilled up, on the spacing pattern actually in effect.

The proved undrilled reserves include reserves under undrilled spacing units which are so close and so related to the drilled units that there is every reasonable probability that they will produce when drilled.



Crude reserves accounted for almost 1.2-billion bbl. of over-all gain, pushing the total to a new high of 31,719,347,000 bbl.

The volume of crude reserves added during 1959 represented a sharp increase over the 235,512,000-bbl. net additions of the previous year.

The gross additions to crude reserves—before deducting production were 3,666,745,000 bbl. during 1959, of which discoveries of new fields and new pools in old fields accounted for 369,362,000 bbl., or 10.1%.

Reserves of natural gas liquids increased 318,290,000 bbl. to a new peak of 6,522,308,000 bbl. Last year's increase in gas liquids reserves fell far short of the 516,658,000-bbl. net addition made in 1958.

Reserves of gas liquids at the end of the year amounted to 17% of the total liquid hydrocarbons reserves.

Only slightly more than one-tenth of the gross additions to reserves of liquid hydrocarbons resulted from exploratory drilling, with the remaining additions accounted for by revisions of previous estimates and extensions to known fields.

The gross additions to total liquid hydrocarbons amounted to 4,370,189,000 bbl., of which 3,891,288,000 bbl. came from extensions or revisions of previous estimates.

The policy of the joint committee is to assign only a conservative estimate of proved reserves to new discoveries.

As knowledge of the factors affecting production and reservoir performance becomes available, and as those factors are studied, reserves in older fields are estimated with greater precision and are revised accordingly.

The volume of reserves added by extensions and revisions was larger than in any year since 1951.

In that year the extensions and revisions amounted to 4,674,195,000 bbl., when the committee revised its estimate of the Spraberry reserves sharply upward.

But a year later, the Spraberry trend reserves were revised downward with

Estimated Crude Reserves in U.S.

(in thousands of barrels)

	Proved Reserves 12/31/58	Extensions and Revisions 1959	New Discoveries 1959	Production 1959	Net Changes in Reserves 1959	Proved Reserves 12/31/59
Ala.	38,586	1,271	0	5,609	—4,338	34,248
Ark.	317,865	18,794	1,074	24,822	—4,954	312,911
Calif.*	3,866,430	195,155	8,080	307,158	—103,923	3,762,507
Colo.	392,060	32,374	2,630	46,112	—11,108	380,952
Ill.	607,589	60,856	2,539	76,577	—13,182	594,407
Ind.	71,469	12,679	1,278	11,475	2,482	73,951
Kan.	922,434	96,918	17,089	118,938	—4,931	917,503
Ky.	126,357	30,965	7,252	28,250	9,967	136,324
La.*	4,043,993	800,459	133,993	318,357	616,095	4,660,088
Mich.	44,968	16,689	4,213	10,535	10,367	55,335
Miss.	378,688	43,644	14,336	47,331	10,649	389,337
Mont.	337,799	—1,464	3,300	30,367	—28,531	309,268
Neb.	69,242	28,326	5,700	22,710	11,316	80,558
N. M.	894,121	222,100	11,909	102,341	131,668	1,025,789
N. Y.	35,803	360	0	1,966	—1,606	34,197
N. D.	314,079	80,598	5,100	17,868	67,830	381,909
Ohio	70,809	9,320	0	5,992	3,328	74,137
Okla.	1,898,128	144,018	16,049	193,446	—33,379	1,864,749
Pa.	119,832	—100	0	6,158	—6,258	113,574
Texas*	14,322,216	1,346,675	129,784	939,001	537,458	14,859,674
Utah	198,639	35,655	207	39,962	—4,100	194,539
W. Va.	52,104	1,320	0	2,165	—845	51,259
Wyo.	1,408,717	114,865	4,679	125,323	—5,779	1,402,938
Misc.	3,989	5,906	150	852	5,204	9,193
Total U.S.	30,535,917	3,297,383	369,362	2,483,315	1,183,430	31,719,347

*Includes offshore reserves.

Liquid Hydrocarbons Reserves in U.S.

(in thousands of barrels)

	Proved Reserves 12/31/58	Extensions and Revisions 1959	New Discoveries 1959	Production 1959	Net Changes in Reserves 1959	Proved Reserves 12/31/59
Ala.*	38,586	1,271	0	5,609	—4,338	34,248
Ark.	352,015	18,942	1,376	27,405	—7,087	344,928
Calif.*	4,168,749	246,727	8,615	336,266	—80,924	4,087,825
Colo.	413,328	39,647	2,708	49,817	—7,462	405,866
Ill.	618,539	60,967	3,789	78,134	—13,378	605,161
Ind.	71,588	12,702	1,279	11,494	2,487	74,075
Kan.	1,121,986	100,128	17,712	125,411	—7,571	1,114,415
Ky.	163,829	44,577	8,744	31,536	21,785	185,614
La.*	5,239,948	1,003,583	166,194	391,809	777,938	6,017,886
Mich.	46,470	16,878	4,240	10,691	10,427	56,897
Miss.	433,870	31,358	15,057	50,004	—3,589	430,281
Mont.	345,296	5,203	3,300	31,020	—22,517	322,779
Neb.	74,941	28,842	5,700	23,493	11,049	85,990
N. M.	1,311,359	238,104	20,795	121,429	137,470	1,448,829
N. Y.	35,803	360	0	1,966	—1,606	34,197
N. D.	345,318	148,706	5,100	19,287	134,519	479,837
Ohio	72,427	9,006	0	5,992	3,014	75,441
Okla.	2,255,635	178,499	19,949	221,765	—23,317	2,232,318
Pa.	123,517	—60	20	6,226	—6,266	117,251
Texas*	17,714,183	1,531,171	187,009	1,142,314	575,866	18,290,049
Utah	213,538	53,603	207	40,433	13,377	226,915
W. Va.	115,390	—26,865	2,171	5,271	—29,965	85,425
Wyo.	1,459,593	142,080	4,706	130,242	16,624	1,476,217
Misc.	4,027	5,889	150	855	5,184	9,211
Total U.S.	36,739,935	3,891,288	478,981	2,868,469	1,501,720	38,241,655

*Includes offshore reserves.

the result that total extensions and revisions in 1952 were only 2,728,030,000 bbl.

The recent upswing in the relative importance of extensions and revisions can be attributed in great measure to the growth in major secondary recovery projects in the recent years.

Reserves that become available as a result of fluid injection are considered proved by the committee only after thorough testing by a pilot project, or after operation of an installed fluid injection procedure has confirmed the anticipation of increased recovery.

Several large waterflood projects in West Texas undoubtedly are responsible for gains there last year, following net declines in reserves in 1958 and 1957.

While some of those waterflood projects date back several years, the committee's conservative approach to evaluation of reserves delays the time that such reserves are considered to be proved.

While the reserves added by extensions and revisions are more than just "pencil" calculations, the fact remains that a decreasing percentage of reserves is being found by exploratory drilling.

Of the gross additions to total liquid hydrocarbons, new discoveries accounted for only 10.9% last year. The average for the postwar period is 16.7%.

One encouraging development in 1959 was that the volume of new liquid hydrocarbons found as a result of discoveries increased by 13.2% over 1958, the first upturn in three years.

Nevertheless, this volume—478.9-million bbl.—was lower than in any postwar year except for 1958, 1951, and 1948.

For crude only, the discovery pattern was similar. The discovery volume was up over 1958, but the ratio of reserves proved by discovery to the total gross additions was far below the postwar average.

Despite the over-all substantial gain in liquid hydrocarbons reserves, more states (12) showed a decline last year than in 1958 (7).

California, which had made a recovery in 1958 after several years of declines, dropped into the minus column against last year. It was joined by Alabama, Arkansas, Colorado, Illinois, Kansas, Mississippi, Montana, New York, Oklahoma, Pennsylvania, and West Virginia.

Louisiana, which has led all other states in addition to reserves during

nearly all of the postwar period, was far out front again last year, adding a net of 777,938,000 bbl. to its total liquid hydrocarbon reserves.

Aided in a large extent by significant offshore discoveries, Louisiana's total liquids reserves of 6,017,886,000 bbl. at the end of 1959 were nearly double the position at the end of 1953.

The state, which has ranked second to Texas in total liquids reserves since 1955, also pulled into second place over California in production in 1959.

Louisiana now has 15.7% of the total reserves and produces 13.7% of the total liquid hydrocarbons. Its years' supply position is 15.4 years.

For crude only, Louisiana, with 14.7% of the reserves, produces 12.8% of the U.S. total.

Texas' reserves of liquid hydrocarbons gained 575,866,000 bbl. last year, boosting its total to 18,290,-049,000 bbl., just slightly ahead of the previous peak, reached in 1953.

But the leading oil state lost a little more ground relatively; the ratio of its reserves to the U.S. total declined to 47.8%.

And its position as a producer also declined—falling to 39.8% of the U.S. total.

Utah, which has substantial additions to its liquid hydrocarbon reserves in both 1957 and 1958, had a more modest gain last year.

The net addition amounted to 13,377,000 bbl., to boost the state's total to 226,915,000 bbl., or 5.6 years' supply.

Gas Reserves Now 262-Trillion Cu. Ft.

Domestic reserves of natural gas rose 3.3% last year to a new peak of 262.6-trillion cu. ft.

This represents a net gain of nearly 8.5-trillion cu. ft., which was achieved even though net production in 1959 rose to a new high of 12.4-trillion cu. ft., nearly 1-trillion cu. ft. higher than in 1958, according to the report of the reserves committee of the American Gas Assn.

Gross additions to gas reserves amounted to 20.7-trillion cu. ft., of which new discoveries accounted for 5.8-trillion cu. ft., or 27.8%.

The new reserves discovered in 1959 were the third-highest ever reported by the committee, though the ratio of discoveries to total reserves found declined from the three previous years.

The volume of gas proved by extensions and revisions, amounting to 14.9-trillion cu. ft., also was the third-highest reported, having been exceeded only in 1955 and 1956.

Gas reserves have increased in each of the postwar years. But with a steady growth in production, the ratio of reserves to production declined slightly last year.

The years' supply position at the end of 1959 amounted to 21.1 years, compared with 22.1 years at the end of 1958, and the postwar average of 23.4 years.

Texas and Louisiana, which account for more than two-thirds of the nation's gas reserves, showed the greatest increases in 1959.

Reserves in both states—but particularly in Louisiana—are aided substantially by offshore reserves.

Texas had a gain of 5.5-trillion cu. ft. last year, boosting the total to 120.5-trillion cu. ft., 45.9% of the U.S. total.

Natural gas production in Texas last year hit a record of 5.7-trillion cu. ft., or 45.7% of the U.S. total.

Louisiana's gas reserves expanded by 4.7-trillion cu. ft. to 59.9-trillion cu. ft., or 22.9% of the U.S. total. Production amounted to 2.9-trillion cu. ft., or 23% of the total.

Smaller increases in reserves were made in Arkansas, Colorado, Illinois, Indiana, Michigan, New York, North Dakota, Oklahoma, Pennsylvania, Utah, West Virginia, and Wyoming.

New Mexico had the largest decline in gas reserves. Its 3.3-trillion cu. ft. drop was due to a downward adjustment in the reserves credited in previous years.

New discoveries in the state during 1959 resulted in 196-billion cu. ft. being found. Previous estimates were revised down by 2.8-trillion cu. ft.

Estimated U.S. Natural Gas Reserves

(Millions of cu. ft.—14.65 psia. at 60F)

	Proved Reserves 12/31/58[b]	Extensions and Revisions[b] 1959	New Discoveries[b] 1959	Net Change in Underground Storage[c]	Net Production[d] 1959	Proved Reserves 12/31/59
Ark.	1,388,337	38,634	60,981	—41	65,094	1,422,817
Calif.[e]	8,966,522	39,321	56,230	—2,787	465,839	8,593,447
Colo.	2,349,240	236,396	26,266	164	115,907	2,496,159
Ill.	170,528	11,655	279	11,112	18,464	175,110
Ind.	30,569	4,682	186	3,444	3,793	35,088
Kan.	20,233,847	279,359	97,365	9,895	639,063	19,981,403
Ky.	1,215,329	—4,467	12,810	3,709	68,000	1,159,381
La.[e]	55,111,862	6,100,270	1,509,830	0	2,868,042	59,853,920
Mich.	498,113	17,877	5,400	13,442	19,429	515,403
Miss.	2,598,377	—16,750	68,031	1,571	164,705	2,486,524
Mont.	682,013	—3,155	14,358	3,691	31,416	665,491
Neb.	143,321	2,623	238	0	13,463	132,719
N. M.	21,180,020	—2,758,846	196,341	2,203	702,514	17,912,798
N. Y.	96,439	8,925	1,575	3,717	4,137	106,519
N. D.	1,124,470	97,481	0	0	15,409	1,206,542
Ohio	818,052	—60,859	11,170	16,714	36,311	748,766
Okla.	15,206,769	1,878,770	510,753	11,096	956,096	16,651,292
Pa.	870,014	217,298	35,180	48,342	118,862	1,051,972
Texas[e]	115,045,743	8,228,792	2,887,699	5,004	5,691,455	120,475,783
Utah	1,058,051	176,088	74,372	0	44,261	1,264,250
Va.	38,421	2,125	375	0	2,289	38,632
W. Va.	1,557,633	174,386	33,000	14,532	186,000	1,593,551
Wyo.	3,649,818	254,558	145,434	—102	202,644	3,847,064
Misc.[e]	108,549	7,946	52,876	20,026	7,435	181,962
TOTAL	254,142,837	14,933,109	5,800,749	161,326	12,448,628	262,596,593

[a] Includes Alabama, Alaska, Arizona, Florida, Iowa, Maryland and Missouri.

[b] Excludes gas loss due to natural gas liquids recovery.

[c] The net difference between gas stored in and gas withdrawn from underground storage reservoirs, inclusive of adjustments and native gas transferred from other reserve categories.

[d] Net production equals gross withdrawals less gas injected into producing reservoirs. Changes in underground storage and gas loss due to natural gas liquids recovery are excluded. Fourth quarter production estimated in some instances.

[e] Includes off-shore reserves.

Canada Shows a Gain, Too

Canada's proved reserves of liquid hydrocarbons and natural gas reached record highs in 1959, but the heady pace of the '50s showed further signs of slackening.

The report of the Canadian Petroleum Assn. provides this statistical picture:

Proved reserves of liquid hydrocarbons, as of last Dec. 31, were just a shade under 4-billion bbl., while those of natural gas topped 26.6-trillion cu. ft.

The increases in proved reserves amounted to 349-million bbl. of liquid hydrocarbons, and 3.3-trillion cu. ft. of natural gas.

Of the total hydrocarbons reserves, 3.4-billion bbl. represented crude, and 502-million bbl. natural gas liquids.

The ratio between net additions to reserves and production tightened up to less than two to one in 1959, down somewhat from 1958, and a far cry from the ratio of three and four to one of earlier years.

In other words, for each barrel of oil that Canadian oil men produced in 1959, the deposits in the reserves bank ran less than 2 bbl. Canadian production in 1959 ran slightly more than 190-million bbl., and reserves increased by 349-million bbl.

In 1958, Canadian output amounted to 17-million bbl. while the net increase in reserves exceeded 380-million bbl. That's somewhat better than two to one.

Except for 1957, when production ran 184-million bbl. and reserves increased by 139-million bbl., the net additions to proved reserves through the early '50s ran as high as four to one over production.

The over-all picture is not gloomy, however, for 1959 was a year of surpluses and slackened operations generally.

The same oversupply factors that affected oil operations around the world were reflected in the Canadian industry.

Canada's stature as a source of sulfur also rose in 1959. CPA estimates Canada's proved reserves of sulfur at 50.7-million long tons, marking the country as one of the world's major sources. This was the first time that CPA included a sulfur estimate in its annual report.

Canada's Reserves of Crude and Gas Liquids

(In thousands of barrels)

	Proved Reserves 12/31/58	Extensions and Revisions 1959	New Discoveries 1959	Production 1959	Net Changes 1959	Proved Reserves 12/31/59
Crude						
Northwest Territories	52,409	0	0	439	—439	51,970
British Columbia	8,958	10,574	687	818	10,443	19,401
Alberta	2,572,610	365,594	89,917	129,243	326,268	2,898,878
Saskatchewan	497,372	43,883	1,723	47,191	—1,585	495,787
Manitoba	27,500	585	0	5,031	—4,446	23,054
Ontario	6,978	471	1,525	1,003	993	7,971
New Brunswick	77	0	0	14	—14	63
Total Crude	**3,165,904**	**421,107**	**93,852**	**183,739**	**331,220**	**3,497,124**
Natural Gas Liquids						
British Columbia	27,576	—5,829	2,095	545	—4,279	23,297
Saskatchewan	34,037	—18,503	0	609	—19,112	14,925
Alberta	422,580	42,325	4,540	5,522	41,343	463,923
Total Natural Gas Liquids	**484,193**	**17,993**	**6,635**	**6,676**	**17,952**	**502,145**
Total Liquid Hydrocarbons	**3,650,097**	**439,100**	**100,487**	**190,415**	**349,172**	**3,992,269**

Canadian Reserves of Natural Gas

(Millions of cu. ft.—14.65 psia. at 60F)

	Proved Reserves 12/31/58	Extensions and Revisions 1959	New Discoveries 1959	Net Change in Underground Storage	Net Production 1959	Proved Reserves 12/31/59
Northwest Territories	29,427	2,923	—	—	287	32,063
British Columbia	1,687,626	334	203,281	—	66,003	1,825,238
Alberta	20,222,824	2,897,819	533,089	1,222	354,285	23,300,669
Saskatchewan	1,165,003	69,907	53,995	3,925	57,238	1,235,592
Manitoba	2,345	48	—	—	434	1,959
Ontario	186,783	12,411	295	29,134	19,656	208,967
Quebec	83	—83	—	—	—	—
New Brunswick	961	3	—	—	116	848
Total Canada	**23,295,052**	**2,983,362**	**790,660**	**34,281**	**498,019**	**26,605,336**

Price Policy Costs Venezuela a Buyer

Venezuela's insistence that producers may not sell Venezuelan crude "for much less than posted prices" has cost it a buyer, who has switched to Middle East crude.

Interamerican Refining Corp., which had been using Venezuelan crude for processing at a "bonded refinery" in New Jersey (PW—Feb.6'60,p11), has signed a long-term contract for 16,000 b/d of Middle East crude, a vice-president of the firm told PETROLEUM WEEK this week. The first cargo is due in New Jersey next Thursday.

Interamerican's crude is refined "in bond" by Petroleum Separating Co. at its Bayonne (N.J.) refinery, and Interamerican exports all the products. In this way, it avoids paying any U.S. imports duty.

Interamerican had been buying its crude through Amoco Trading Corp., which had bought it at a discount from posted prices from U.S. companies operating in Venezuela. But Venezuela's Minister of Mines & Hydrocarbons Dr. Juan Perez Alfonzo cracked down on the discount sales "because they endanger Venezuela's policy of maintaining prices" (PW—Mar.11'60,p12).

"This raises the question," the Interamerican executive told PETROLEUM WEEK, "whether Venezuelan posted prices can remain, or whether Venezuela will have to permit producers to meet world competitive prices."

Texaco Switches Trinidad Supply

Texaco Inc. has stepped up the processing of Persian Gulf crude in its Trinidad refinery, in a source-of-supply switch affecting Paragon Oil Co., its East Coast subsidiary.

Texaco acquired Paragon, a big independent fuel oil distributor, as a wholly owned subsidiary last year.

Paragon, until recently, had been obtaining considerable fuel oil from Pemex, and had been regarded as the Mexican government agency's biggest single account, running 30,000 to 35,000 b/d. Now it will get its fuel oil from its parent, in Trinidad.

Paragon's contract with Pemex expired last month.

The termination could not be considered a surprise for Pemex officials; they had been worrying about the future of the contract for months (PW—Sep.4'59,p52).

The crude that Texaco is moving to Trinidad is from the Safaniya field, and is only part of Texaco's offtake of Arabian-American Oil Co. production. Aramco scheduled an output of around 141,000 b/d of Safaniya crude in 1960, although the actual production currently is running substantially higher.

Trade reports indicate that Texaco's Trinidad shipments are scheduled to run about 60,000 b/d to supply the Paragon account with enough fuel oil to replace that formerly bought from Mexico.

Texaco has an extensive expansion program under way at its Trinidad refinery, which ultimately is scheduled to become one of the largest in the world.

Construction was started last year to raise throughput by 100,000 b/d. When all of the new units are on stream, the Pointe-a-Pierre refinery will have a throughput capacity of 250,000 b/d.

Texaco spokesmen declined to affirm or deny the trade reports, regarding the whole matter as an internal affair.

Oil Sees No Problem in FTC Probe

The big tizzy in the advertising world over the government crackdown on radio-TV commercials and published advertisements isn't worrying oil industry ad managers and agencies.

Most of those contacted by PETROLEUM WEEK concede that they have reviewed their past advertisements and commercials, and have taken a second look at contemporary copy and scripts, just to be sure.

But each feels that his own company's claims are supported by fact, and are neither misleading in intent nor questionable in taste.

None expresses concern over the Federal Trade Commission campaign, which has been focused on consumer goods, and has occasioned changes in advertising claims and commercials in other industries.

Generally speaking, oil industry advertising managers feel that their product promotion campaigns and claims have been on the conservative side.

One big marketer points out, for example, that every one of his company's advertisements and commercials has been screened not only by the legal department, but by the company's research experts as well.

Other majors follow similar patterns, with the review groups including company executives and departments not directly related to sales promotion.

No ad manager could recall any instance where an oil company had been accused of bad taste or misrepresentation, such as the FTC has charged in other fields.

"Of course," one industry executive commented humorously, "everyone claims he has the best gasoline on the market.

"But that's no misrepresentation. That's a tribute to the industry generally, and the constantly increasing quality of its products."

Oil Man's Album

'Above-Ground' Storage, Circa 1901

Above-ground, or pit, storage of oil dates back to the Spindletop days of the very early 1900s. The Earthen storage excavation (above) held 3-million bbl., a necessity in the days prior to the development of methods to control production from prolific wells. These spectacular "lakes" later disappeared from the landscape in the U. S., but recently such methods have been used abroad, particularly for "off-season" storage of residual fuel oil.

(No. 39 in a Petroleum Week series.)

Five Companies Pace Import Trading

Five importers—Atlantic, Gulf, Jersey, Socony, and Tidewater—are doing the most business in exchange agreements under the government's oil imports program.

The Interior Dept.'s Oil Import Administration this week issued figures showing that about 300,000 b/d of imported crude are being swapped for domestic oil supplied by the five largest traders and others.

The Import Administration listed, in Districts I-IV, 16 oil companies receiving 258,816 b/d of imported crude from 102 other companies in exchange for domestic oil. In District V, the West Coast, six companies are getting 38,816 b/d of foreign-produced oil in exchanges with six other companies.

More than one of every three barrels of imported crude entering Districts I-IV is being exchanged.

A total of 718,218 b/d has been allocated for import in the areas east of the Rockies for the January-June allocation period; almost 259,000 b/d are being exchanged.

Atlantic and Tidewater are getting more imported oil via trades than under their own allocations. Atlantic has a crude-and-unfinished oil allocation of 38,000 b/d in Districts I-IV, and the company is exchanging domestic oil for an additional 41,184 b/d of imported oil offered by 14 other firms.

Tidewater, with a District I-IV allocation of 22,100 b/d, receives 25,550 b/d through exchange agreements.

Standard Oil Co. (N. J.) gets the most imported oil—45,597 b/d—by exchanging domestic crude.

This amount, all in Districts I-IV, is only slightly less than Jersey's allocation of 46,499 b/d.

The Interior Dept. says it is "impossible to report with accuracy" the exact amount of domestic oil involved in the trades, because of varying rates of exchange at the time of delivery.

The following companies lead the list of Districts I-IV traders for imported oil this year (each company's Districts I-IV crude-and-unfinished oil allocation is shown in parentheses):

Atlantic (38,000) receives 41,184 b/d of imported oil through exchanges; Gulf (71,990), 32,008 b/d; Sinclair (40,120), 16,489 b/d; Standard Oil Co. of California (43,070), 13,456 b/d; Socony (43,300), 30,229 b/d; Jersey (46,499) 45,597 b/d; Sun (32,550), 14,244 b/d; Texaco (35,120), 14,459; and Tidewater (22,100), 25,550.

In District V, largest traders for imported oil are Richfield, which is receiving 9,170 b/d; Standard of California, 12,168 b/d; and Texaco, 12,114 b/d.

Producers Set Gas Legislation Aims

Producers are setting their sights for legislation that would exempt them from utility-type control on natural gas and would provide "protection" for consumers.

That is understood to be the essential agreement that was reached last week in Wichita, Kan., by a five-member subcommittee of the liaison committee of the cooperating oil and gas associations.

The producers appear to prefer legislation that would define the extent of the Natural Gas Act of 1938 so as to leave only interstate transmission firms as "natural gas companies" under the act. That would exempt gas producers from requirements of certification, reporting, or justification of increased rate schedules of the Federal Power Commission.

The key to the producers' thinking is a new determination of a "reasonable market price" which would prohibit the use of a cost-of-service rate-base concept.

The producers suggest that a reasonable market price could be determined as follows:

When a pipeline company applies for rate increases based on changes in producers' contracts, FPC must approve new contracts or changes in existing contracts as reasonable before increases can be sought.

If the price for new gas is above the reasonable market price, producers' contracts would be nullified and producers would be free to renegotiate.

On old contracts where escalating prices lead to the application for higher rates by a pipeline company, the gas would not be freed, but producers would be limited to the reasonable market price.

Distributors and consumers would retain their right of intervention and the right to institute proceedings against rate increases, as now permitted.

Another producer desire is for a review of prices in some areas that are unduly low in relation to more recent contracts.

Producers believe that upward revision of these old contract prices would discourage dumping of gas and would provide incentives for new exploration by producers.

U.S.-Flag Ships Pushed in Study

The Commerce Dept., in a new report urging correction of an "out of balance" national transportation system, says U.S. industry should use more American-flag vessels in carrying materials.

Secretary of Commerce Frederick Mueller this week submitted to President Eisenhower a major transportation study, with sweeping recommendations for less governmental regulation and more user charges.

But the report apparently does not support tanker groups that want a mandatory role in the transportation of imported petroleum.

One tanker group currently has a petition before the Office of Civil & Defense Mobilization asking that 50% of imported oil be carried in American-flag tankers.

The Commerce study, however, says only that the U.S. should examine closely practical means to accomplish a higher rate of American-flag shipments, such as "stepping up a long-range information program for exporters and importers."

The report makes no recommendation that the Administration require use of U.S.-flag vessels.

A long-range research and development program for the merchant marine and shipbuilding industries is recommended.

The Mueller report proposes this solution as an eventual replacement of government subsidization.

Oil pipelines draw no attention in the transportation report.

One pipeline official in Washington interprets the lack of pipeline interest by the Mueller group as a strong indication that the Administration is satisfied with present operations and regulation.

What's New / IN THE INDUSTRY

A wildcat that blew out and burned gas for eight days in the Scipio area of Michigan has been brought under control (PW—Mar. 11'60,p18). The Perry Fulk test, section 1-4s-4w, Homer Township, Calhoun County, caught fire when escaping gas was ignited by a broken light bulb.

McClure Drilling Co., of Alma, is moving in another rig, and operations are expected to resume in five or six days.

Red Adair, fire-fighting specialist, blasted to extinguish the fire.

•

Cities Service Oil Co. has developed a new bulk grease-delivery method that "paves the way for substantial savings in over-all lubrication costs."

The company uses a tractor-trailer unit with two vertical cylindrical containers, each capable of holding 12,000 lb. of grease. Both containers can be unloaded into customers' central storage tanks, designed for the purpose, in about an hour. Previously, the grease was shipped in 400-lb. drums, which were stored until needed.

The new method eliminates time-consuming and expensive handling of individual drums, and makes possible substantial savings in customers' storage space, Cities Service says.

•

Ultramar Co., Ltd., British investment firm, is seeking stockholder approval to acquire the capital stock of Panama Refining & Petrochemical Co.

The company, which has set a special stockholder meeting for Mar. 28 to consider the acquisition, describes the acquisition as "an important first step" in becoming an integrated company.

Ultramar, which already has a producing interest in Venezuela, says it plans to expand capacity from 9,000 b/d to 30,000 b/d at the Los Angeles refinery of Golden Eagle (Panama Refining's subsidiary). Ultramar is also negotiating with unidentified oil firms to become partners in building a refinery in Panama, for which Golden Eagle has a site and concession.

•

Virginia increased its gasoline tax last week despite a valiant "fight" by service station dealers to stave off the 1¢ boost (PW—Mar.11'60,p11).

The hike, effective July 1, will increase the tax for passenger vehicles to 7¢ and for trucks to 9¢.

•

Esso Standard Division of Humble Oil & Refining Co. has signed a two-year labor contract at its Baton Rouge (La.) refinery. The Independent Industrial Workers Assn. voted approval last week.

The contract carries the following changes: (1) elimination of a refinery mechanic classification instituted a year ago, with work assignment provision to give necessary flexibility for performing mechanical work; (2) no general wage boost—but adjustments averaging 9.8¢ per hour for over 1,800 employees; (3) an improved grievance and arbitration procedure; and (4) several changes in seniority provisions.

•

Shell Oil Co. this week started seismic work on its 800,000-acre lease in the Mississippi Sound, in the Gulf of Mexico west of Mobile Bay.

It marks the third time since 1938 that oil men have started exploration there—with no luck to date. Four dry holes have been drilled, the last one in 1956.

Shell conducted preliminary exploration of the sound during December and early January.

•

Columbia Gas System plans to cut fleet acquisition and operating costs $340,000 by using 800 U.S.-made compact cars.

Under the company's replacement policy, it will take four years for the 800 compact cars to be integrated into the system's fleet.

Choosing an Antioxidant?

Refinery customers have found that, in comparison with other inhibitors, Dalpac 4 (Hercules 2,6-di-tert-butyl-p-cresol) saves up to three dollars on every thousand barrels of gasoline produced. Dalpac 4 inhibits gum formation, stabilizes gasoline color, and helps maintain engine cleanliness. Refiners have also found it to be excellent in turbine and transformer oils where it prevents deterioration, and does not affect electrical properties.

For additional information write:

Oxychemicals Division
Naval Stores Department
HERCULES POWDER COMPANY
900 Market Street
Wilmington 99, Delaware

Looking Ahead in Washington

Mc-Graw-Hill
Washington
Bureau
March 18, 1960

A ranking Federal Power Commission official warns natural gas producers: "Don't say regulation is impossible." Speaking privately, the officer says federal regulation of producer prices and sales must be worked out. The alternative is not complete decontrol, he predicts, but even more severe restrictions. The FPC official cites as evidence a growing trend of consumer interest in commission decisions. In the years immediately following the U. S. Supreme Court's Phillips decision bringing producers under FPC jurisdiction, most court appeals of commission actions were brought by producer groups. But in recent years, the trend has shifted to appeals by consumer bodies, state regulatory commissions, and local distribution companies.

•

The House Ways & Means Committee will hold hearings this month on a tax-increase bill affecting foreign operations. Two days of hearings are scheduled to start Mar. 28 on a proposal that would apply the same tax treatment to foreign subsidiaries of U. S. companies as is now applied to foreign branches. The effect would be to increase the taxes paid by subsidiaries.

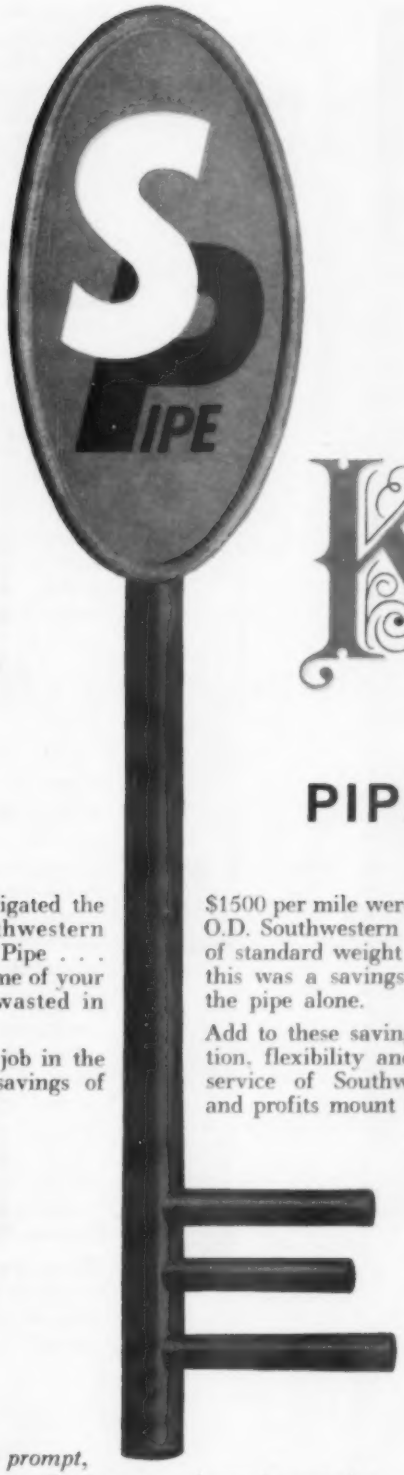
Meanwhile, a bill to stimulate foreign investment is in trouble in Congress. The bill is HR-5, sponsored by Rep. Hale Boggs (D., La.). The Boggs bill, supported by many oil companies with overseas interests, ran into stiff opposition on the House floor. The measure would permit the establishment in the U. S. of "foreign business corporations," which would postpone payment of U. S. taxes as long as their earnings were reinvested abroad. The Administration prefers a different approach to spurring foreign investment, however, and protectionists in Congress oppose almost any type of additional incentive. House observers say a lack of enthusiasm for the Boggs bill by Chairman Wilbur Mills (D., Ark.) of the Ways & Means Committee is also partly responsible for its troubles. Although Boggs and other backers still hope to rescue the measure, its chances for passage during this session now appear darkened.

•

The coal industry is hopeful that Congress may approve a new fuels study, once the civil rights issue is resolved. Coal leaders, apparently ready to accept a revised version of the fuels study resolution, plan to push hard in both House and Senate soon after the time-consuming civil rights debate ends. The revised resolution will delete language referring to "end-use" control of fuels, thus easing some of the oil and gas industry opposition. But more meetings between coal and petroleum groups are in store, and a lot more congressional bases must be touched before the study idea can proceed.

•

The Federal Power Commission will go into new congressional hearings on "ethics" fully confident of its record. The House watchdog subcommittee on governmental regulatory agencies—headed by Rep. Oren Harris (D., Ark.)—is studying legislation to devise a code of ethics for the federal regulators. One FPC member says the commission has been investigated by Harris' staff previously and has "come out completely clean." There has been no evidence of any undue influence on the commission's activities by the natural gas industry or any other group or person, the commissioner maintains.



KEY to PIPELINE PROFITS

If you haven't investigated the advantages of Southwestern LIGHTWALL Line Pipe . . . it's a good bet that some of your potential profit is wasted in pipe cost.

On a recent 35-mile job in the mid-continent area savings of $1500 per mile were made by using 4.500" O.D. Southwestern LIGHTWALL instead of standard weight of the same size—and this was a savings on the initial cost of the pipe alone.

Add to these savings the ease of installation, flexibility and the long trouble-free service of Southwestern LIGHTWALL and profits mount still further.

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Thousands of varied applications throughout the world are proof of the versatility and performance of this most widely-used drillable production packer.

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Though designed for permanent high-performance pack-off, special emphasis has always been placed on drillability. Now, through the use of the new Baker Packer Milling Tool, drill-out time has been reduced by as much as 75%.

Today, more than ever—Only the Baker Packer does so many jobs so well!

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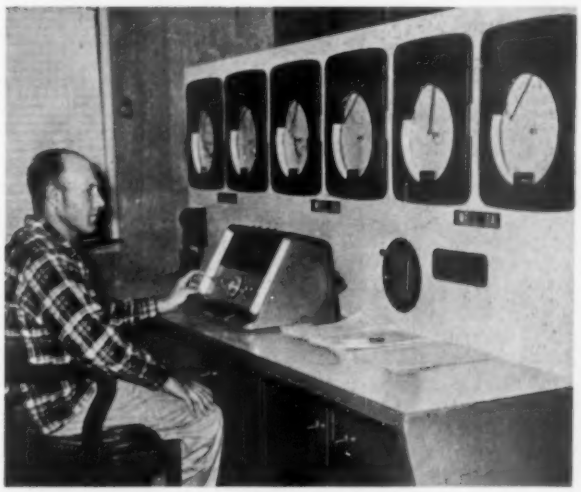
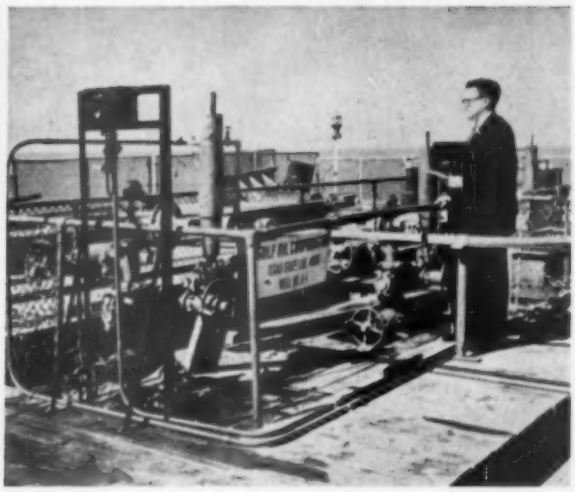


SHORE-BASE CONSOLE controls all functions of gas wells on Gulf Oil's Block 889 platform in Mustang Island (Tex.) area.



UPRIGHT CYLINDERS on wellheads are automatic wing valve controls that start or stop production from shore-base signals.

Offshore Wells Remotely Controlled

An automatic well-control and measurement system designed especially to withstand the tough marine environment off the Texas coast is being put through final trial stages by Gulf Oil Corp.

The installation climaxes several years of study by Gulf engineers and many months of work by electronics specialists.

The system will permit production of three gas wells on Gulf's Block 889 platform in the Mustang Island Area, 3½ mi. from shore, by remote control from a shore-based station.

The system, designed and built to Gulf's specifications by Texas Instruments Inc., is a digital code supervisory type with heavy emphasis on transistorized components.

Work on the system was handled by TI's Geosciences & Instrumentation Division, in Houston.

"We spent quite a while studying our problem and investigating what had been done," a Gulf engineer explained. "We needed a system that would be dependable in the face of some pretty rough conditions.

"We wanted a system that would perform all of the necessary functions, but we wanted to stay away from an unnecessarily complicated setup. We think that this system is pretty close to the solution we sought."

The three wells on the Gulf platform have a combined maximum production of 15-million cf/d of gas and approximately 700 b/d of liquids.

Each of the three wells produces into a separate low-temperature processing unit, which removes and disposes of produced water.

The condensate is removed and measured with a dump-count positive-displacement meter, and the separated gas is measured with an orifice meter. The oil and gas are then recombined for movement to shore through a 6-in. flow-line. The oil and gas are separated again on shore.

Weather-protection measures incorporated into the system range from hermetic seals to air conditioning.

All of the electric relays (each a plug-in type to facilitate easy replacement) are hermetically sealed to protect them from marine elements. This feature also adds to the explosion-proof nature of the system.

All mechanisms with close-fitting moving parts are mounted in dust-free, gasketed steel boxes—particularly such items as the stepping switches used in the TI supervisory control equipment.

All electronic circuit components not enclosed in hermetically-sealed or gasket-sealed protective covering were sprayed with a moisture- and fungus-proof varnish to protect them from corrosion.

All field wiring was covered with a heavy neoprene insulation, and was laid in explosion-proof conduit, designed to withstand marine conditions. All critical junction points were sealed off and fitted with drains and breathers to minimize the condensation of water inside the conduit.

The metal surfaces of the shore station console and the platform cubicle were covered with Dimetcote No. 3—a coating offering high resistance to marine corrosion.

The same type of coating was applied also to such components as the transformer assembly on the platform and the cable termination pothead onshore.

Gulf installed unit air conditioners in both the shore station and the platform cubicle to help keep the air dry and to maintain a uniform temperature.

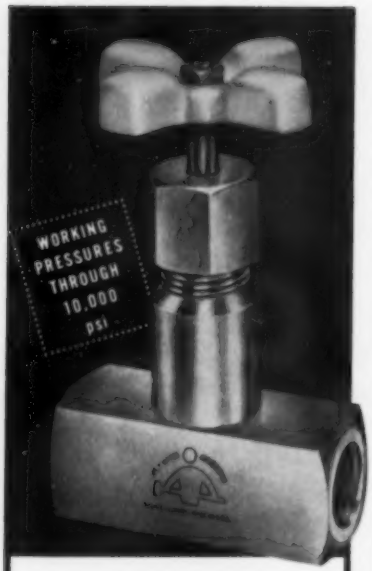
The company also has equipped the station and cubicle with interior-mounted space heaters to help maintain a proper temperature. If the temperature inside drops or rises beyond the normal operating range, an alarm alerts the operator.

Both the shore and the platform sections are purged by positive gas pressure to insure that the electronics systems is kept moisture-free.

Both halves of the system's "brain"—the electronics equipment housed in the shore-based console and that located in the platform cubicle—receive a steady inflow of nitrogen.

Since both are airtight and of heavy steel construction, the purging insures that no moisture-laden air will enter the cabinets.

The nitrogen, which enters the compartments at the rate of 1 cu. ft. to 3½ cu. ft. per hour, is regulated



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Here is a needle valve for today's needs . . . the kind of product that only Marsh experience in *both* valve making *and* instrument making could produce . . . the one valve that gives precision throttling at *any* pressure — from a few pounds through 10,000 pounds.

For extra stamina and extra safety its body and stem guide are machined from solid bar stock. For greater precision, stem is accurately machined from hardened stainless steel and has fine, closely fitted threads that provide tighter shut-off; closer and more positive flow regulation. Special "Marpak" one-piece packing is long lasting and does not bind even when valves are used on higher pressures.

Marsh Needle Throttling Valves are made in a full range of sizes and patterns — either with steel bodies and stainless steel stems (type 1900) or in stainless steel throughout (type 1924).

Ask for bulletins

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by a rotameter mounted on the outside of the compartments.

All functions for the gas wells on the platform are remotely controlled from the shore station.

The console operator at the shore station can measure: (1) wellhead pressure; (2) flow-line pressure into the separator; and (3) flowline temperature into the separator (actually, two temperatures—the liquid knock-out tank temperature and the cold-zone temperature in the separator).

The operator can adjust or control: (1) the rate of flow from each well; (2) the set point for the temperature controller on each individual separator; and (3) a pump which injects corrosion inhibitor chemicals.

The operator can also shut in or open each well.

A "status scan display panel" keeps the operator informed of the situation at each of several alarm-signal points. The alarms signal a variety of conditions, including whether the four navigation lights on the platform are burning and whether the wellhead valves are open or closed.

One of the unusual items on the alarm system is the monitor on the platform's foghorn. It is an audio pickup device which literally "listens" to the horn. Each blast of the horn charges up a circuit and automatically notifies the shore station that the horn is on by triggering a green light. If the interval between the horn blasts is too long, the gradual discharge in the circuit switches the light on the scan panel ashore to red.

The system can easily control more wells and platforms.

The unit was designed and built to handle up to 1,000 points, with that many numbers in its digital code system.

Its control and measurement functions now require the use of only 35 numbers. So the system can be expanded to control additional platforms or wells simply by extending it to them.

Control over production is achieved by manipulating four key variables and observing their effect upon measured flows, temperatures, and pressures.

The operator follows a definite sequence to transmit a command or to order a report. He first dials a code number on the TI "Data Gage." The system then isolates and identifies the correct control point, and the point identification numbers appear visually on the receiver of the console.

The operator then has 40 seconds in which to press a "proceed" button which actually executes the command.

DUMP METER on this gas well measures condensate production.

The four variables are:

(1) Operation of a McEvoy Co. wing valve control on each wellhead. This spring-loaded, piston-operated valve puts the well into or out of production.

Opening the valve by remote control is simply a matter of applying hydraulic pressure to the operating cylinder by energizing a solenoid valve. The operator dials one number to open the valve, another to close it.

(2) Control of the chemical pump. The operator simply dials the correct command code number to start or stop the pump.

(3) Control of the McEvoy adjustable chokes. These motor-operated needle valves regulate the production rate for each well, utilizing Hammarlund tone telemetering equipment. Again, the operator dials a code number to select the proper well and then presses the proceed button. He then presses and holds down an "increase" button which applies an AC voltage of 1,075 cycles per second to the transmission line, causing a relay to apply power to the choke motor, opening the choke.

The same procedure is followed for reducing production, with a "decrease" button applying a tone frequency of 865 cycles per second to reverse the process.

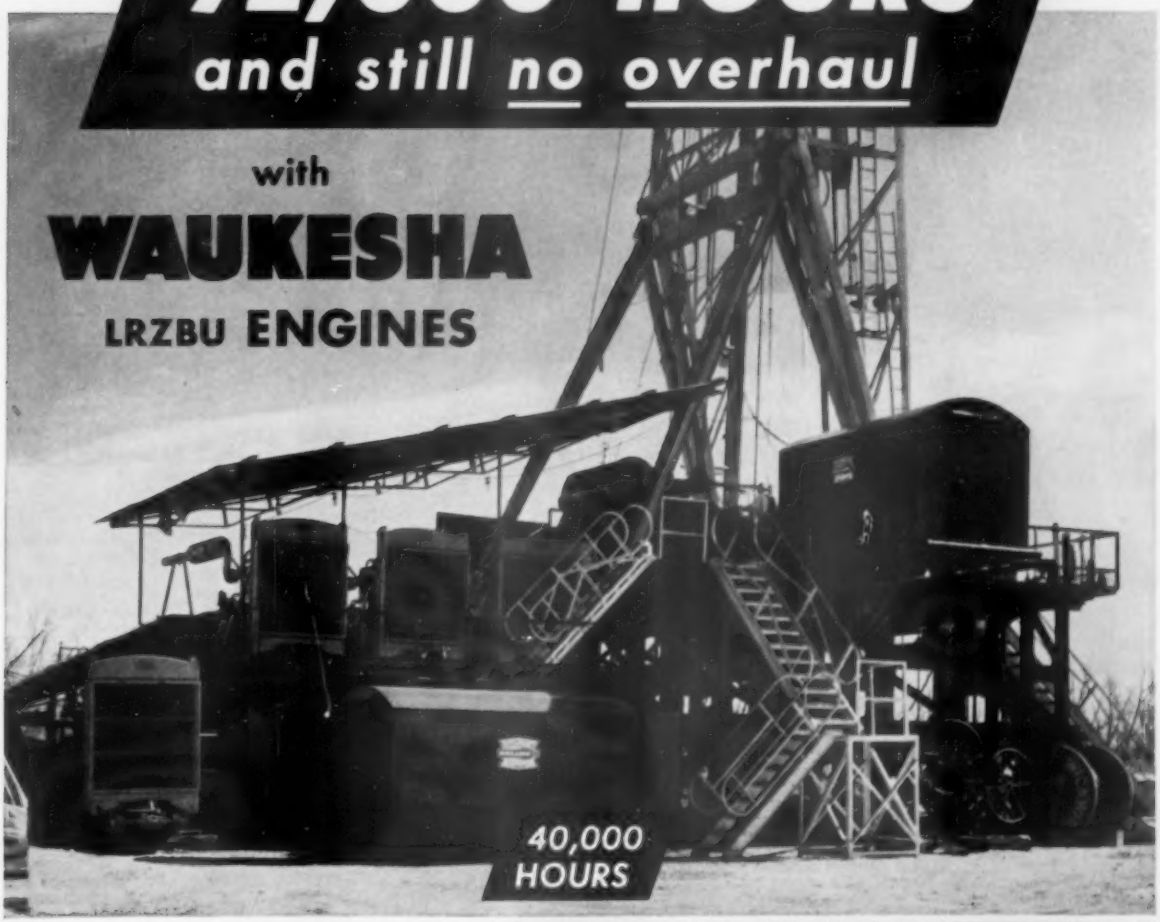
It takes about 12 minutes for one of the chokes to run from full close to full open.

(4) Adjustment of temperature controller set points. This Foxboro controller is operated in an identical manner to the choke adjustment, with a different set of tone frequencies being transmitted to increase or decrease the temperature-set point reading.

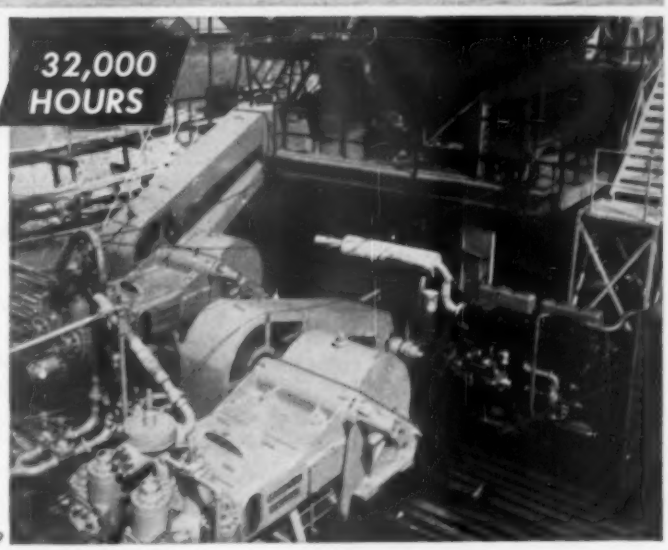
TWO RIGS total
72,000 HOURS
and still no overhaul

with

WAUKESHA
LRZBU ENGINES



Two FRED WILSON DRILLING CO. rigs shown operate in southern Louisiana. Rig 12 has four and Rig 9 has three Waukesha gas power units, Model LRZBU, six cyl., 9⅜-in. bore x 8½-in. stroke, 3520 cu. in. displ. Rig 12 (above) has 40,000 hours service; Rig 9 (right) 32,000 hours. No engine has had any overhaul, and practically no repairs, reports Mr. Fred Wilson . . . these are just some reasons why his equipment is 100% Waukesha powered. He operates six rigs (two each of National 110, 80B and 55 sizes) and sixteen Waukesha LRZBU; three LRO; one each NKU, WAKU, 145-GKU; and several XAHU power units. Send for Bulletins.



449

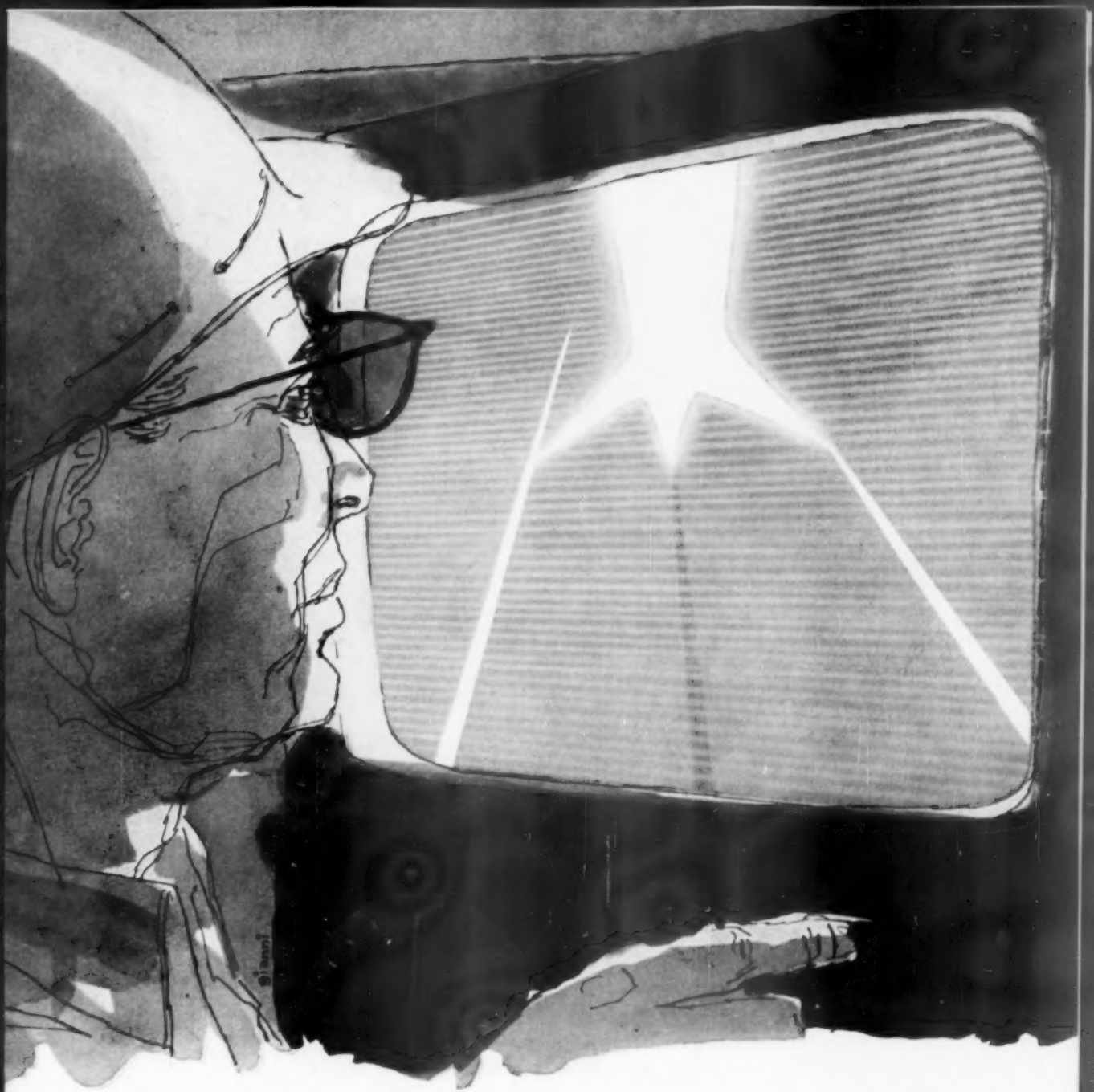
WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN / New York • Tulsa • Los Angeles
Factories at Waukesha, Wisconsin and Clinton, Iowa

Spying on a weld

A TV camera is the spy! Located inside that hulking section of USS National Electric Weld Line Pipe, it's a visual guide to accurate welding.

The operator welds by remote control. He uses push buttons to operate a welding head inside the pipe. Just in front of the welding head is a short-focus TV camera.

When the image flashes on the TV screen, the operator sees reference lines and uses them as a guide. This enables him to keep the electrodes for the inside weld centered on the seam of the formed plate. *In short:* the TV camera makes precise guiding of the welding possible.



The constant development and improvement of production techniques are just two of the reasons why National Tube is not only the largest but also the most experienced manufacturer of tubular products in the world. For more information on USS National Line Pipe, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. Ask for bulletin #23.

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Big Gains Forecast for Air Drilling

Some 30% of all hard-rock drilling will be with air or gas by the end of 1962, compared with today's 3%, according to a West Texas company specializing in such work.

The prediction, made by F. W. Smith, general manager, Technical Drilling Service, Midland, reflects some of the optimism shown by air/gas drilling proponents today.

Smith told PETROLEUM WEEK that his company, an air/gas drilling service firm, is optimistic because of the numerous improvements made in air/gas drilling techniques.

He cited five such important developments: (1) better water shutoff techniques; (2) aid in solving crooked-hole problems; (3) better all-around drilling methods; (4) expanding operations in cleanout and deepening work; and (5) better methods of coring and drilling into formations.

Evidence of improvement can be noted in field tests throughout the Permian Basin, says Smith. One example is the new world depth record for air/gas drilling (PW—Dec.30'59, p21). Until about five years ago, he notes, air and gas drilling had been largely experimental. Results of these early efforts are now beginning to pay off.

A solution to one of the greatest problems in air/gas drilling—water shutoff—may be in sight, says Charles K. Sufall, superintendent of Technical Drilling Service.

Sufall told PETROLEUM WEEK that squeezing with silicon tetrafluoride, a heavy, colorless gas with a sharp odor, promises to make water shutoff routine in most cases, and reduce it significantly in the rest.

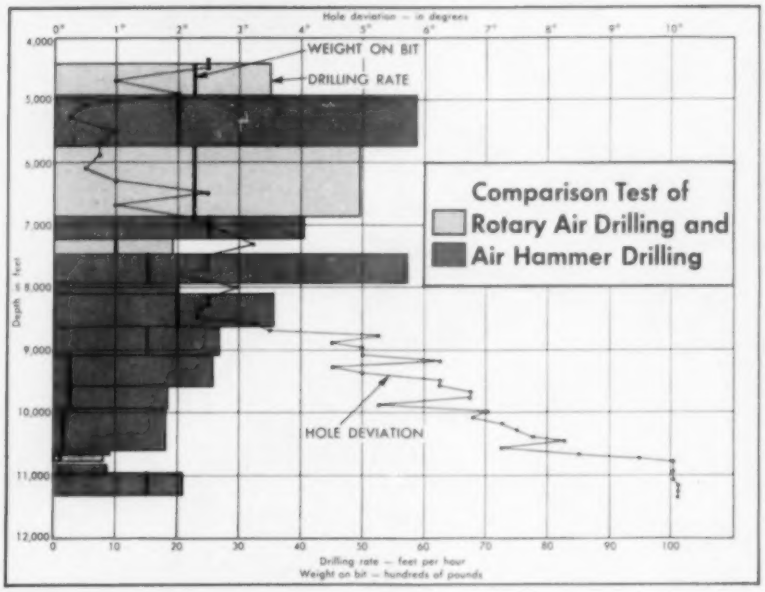
He reports that three of every four jobs involving the new technique have been successful; that is, air or gas drilling could be continued economically after water had intruded. In half of all successful jobs, complete shutoff of water was accomplished; in the other half, water intrusion was cut by at least 50%.

Treating a water zone with silicon tetrafluoride is relatively simple. No special equipment is needed, and the over-all treatment requires little time.

Other chemical additives also are used, depending on water conditions encountered.

The next most troublesome problem encountered in air/gas drilling has been deviation of holes. Air-hammer drilling, however, shows promise of minimizing this problem.

Technical Drilling Service has been testing the tool, manufactured by Mission Mfg. Co., in the Permian Basin (PW—May22'59,p24).



AIR HAMMER drilling cut deviation markedly, and increased penetration rates 1½ times over rotary air drilling, on this Terrell County (Tex.) deep test.

H. F. Downs, also of Technical Drilling Service, reported on five tests of the air hammer in West Texas at the recent meeting of the Southwestern District, Division of Production, American Petroleum Institute, in Dallas.

Downs said that in addition to its capability for drilling straighter holes, the hammer drill shows promise of reducing drilling costs by nearly doubling penetration rates over usual rotary air drilling, and increasing bit footage.

Downs noted, however, that results of the tests are not conclusive, and that further evaluation is needed.

On its latest and most extensive field test, the hammer drill was used in hard-rock country at a deep Terrell County test.

The hammer drill was used in drilling most of an 8¾-in. hole from 4,114 ft. to 11,330 ft. in ten rotating days.

A total of 15 bits were used, with bit weights varying from 1,000 lb. to 20,000 lb. Downs said that air-hammer and conventional air-rotary drilling were used alternately between 4,114 ft. and 7,462 ft. He said that through this interval of similar formation and using comparable weights on bits and rotary speed, air-hammer penetration rates were 1½ times faster than air rotary.

Deviation remained less than 3½ degrees through 4,280 ft. of hole drilled to a depth of 8,700 ft., he added. A sudden unexplained increase in deviation occurred between 8,700-800 ft., where it was extended to 5¼ degrees. Further increases in deviation were recorded to a maximum of 11 degrees at 11,200 ft., Downs said.

Deviation in a mud-drilled interval from 13,300-14,500 ft. rose to 26%, he reported. Further work on deviation control is necessary, however, Downs added.

Technical Drilling, licensed operator of the tool, says it has been used in several other wells to good advantage and will be field-tested much more extensively in the months ahead.

Generally, the company reports, its experience with the percussion tool shows that it will make hole two to four times faster than will conventional air/gas rotary.

Downs also said that the tool is designed to operate under mist drilling, but no efforts have been made by the company to evaluate its performance in the Permian Basin under these conditions.

Better drilling techniques, such as mist drilling, also offer improved efficiency in air/gas drilling, says Technical Drilling.

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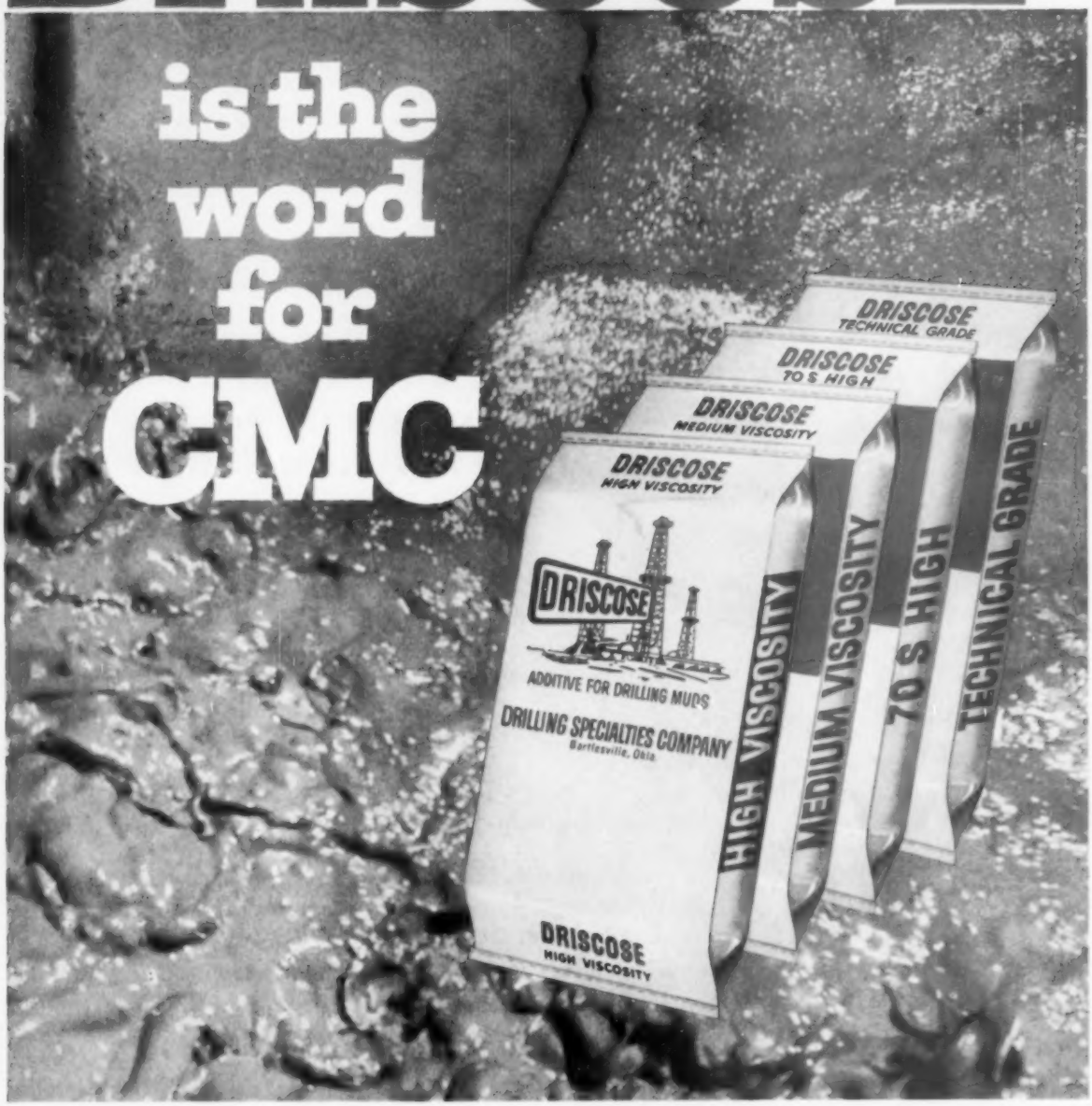

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hole cleaning in mist drilling enables faster drilling rates, says Smith.

He says that water intrusion no longer determines the end point for air/gas drilling. The technique known as mist and slug drilling has extended the use of air/gas drilling beyond wet zones, while maintaining dry-drilling economics.

This method involves injection into the air or gas stream of certain chemicals which permit control of intruded water and continuation of air or gas drilling.

Smith says the method was developed and proved effective in 1958, and that current tests continue to confirm its merits. On one recent West Texas test, for example, drilling was at the rate of 30 ft. per 24 hours per bit with conventional fluid, Smith reports. By changing to the aerated method, he adds, drilling increased to 150 ft. per 24 hours and to as high as 350 ft. per bit.

Technical Drilling uses two types of concentrated detergents for mist drilling, which is commenced as soon as a water zone is encountered. Normally, a mixture of 1 gal. of foaming agent to 10 bbl. of water is used as a starting point. The injection rate varies with hole size, penetration rate, and the amount of water influx. Usually, the volume of mixture falls between 5 gal. per minute and 20 gal. per minute.

Sufall says Technical Drilling uses "Tech. No. 2" (FA1) for about 99% of all mist and slug drilling operations.

Air/gas drilling also is becoming more commonplace in cleanout and deepening operations.

Technical Drilling cites these advantages for cleanout work: reduced rig time; more effective cleanout work; wells off production fewer days; and no contamination to present producing zones.

For deepening operations, these advantages are claimed: faster penetration; longer bit life; continuous drillstem test; and elimination of the cost of circulating fluids.

Advantages of air and gas in coring and drilling into productive zones are cited as: no damage to formation; continuous drillstem test; no contamination to core; faster penetration as compared to fluid cores; and better percentage of recovery.

Sufall says, however: "A lot of improvements have been made, but we're not fully satisfied with all air and gas drilling performances.

"In the future, we're especially looking for better chemicals—foaming agents and lubricants—and any improved way of drilling faster."

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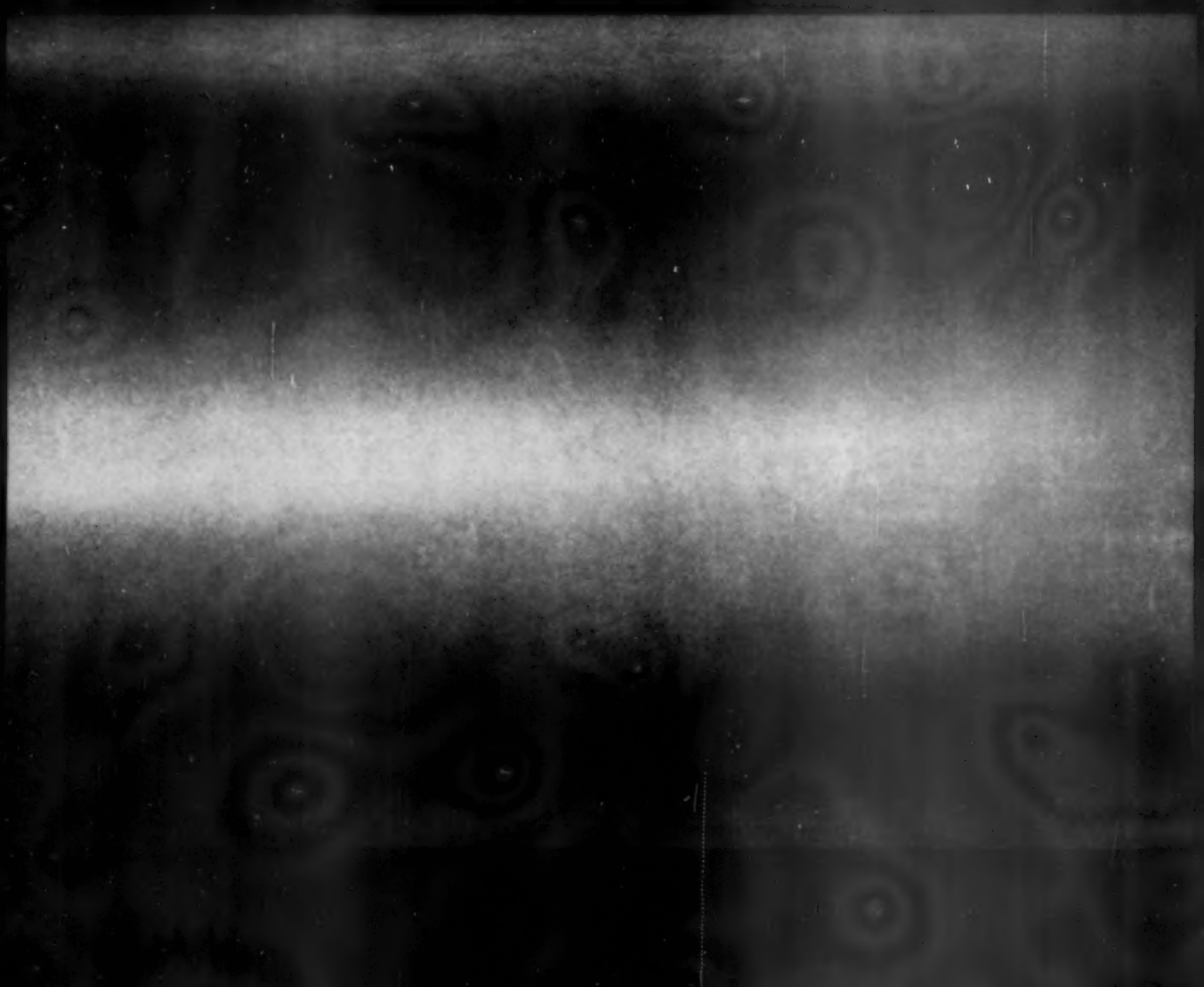

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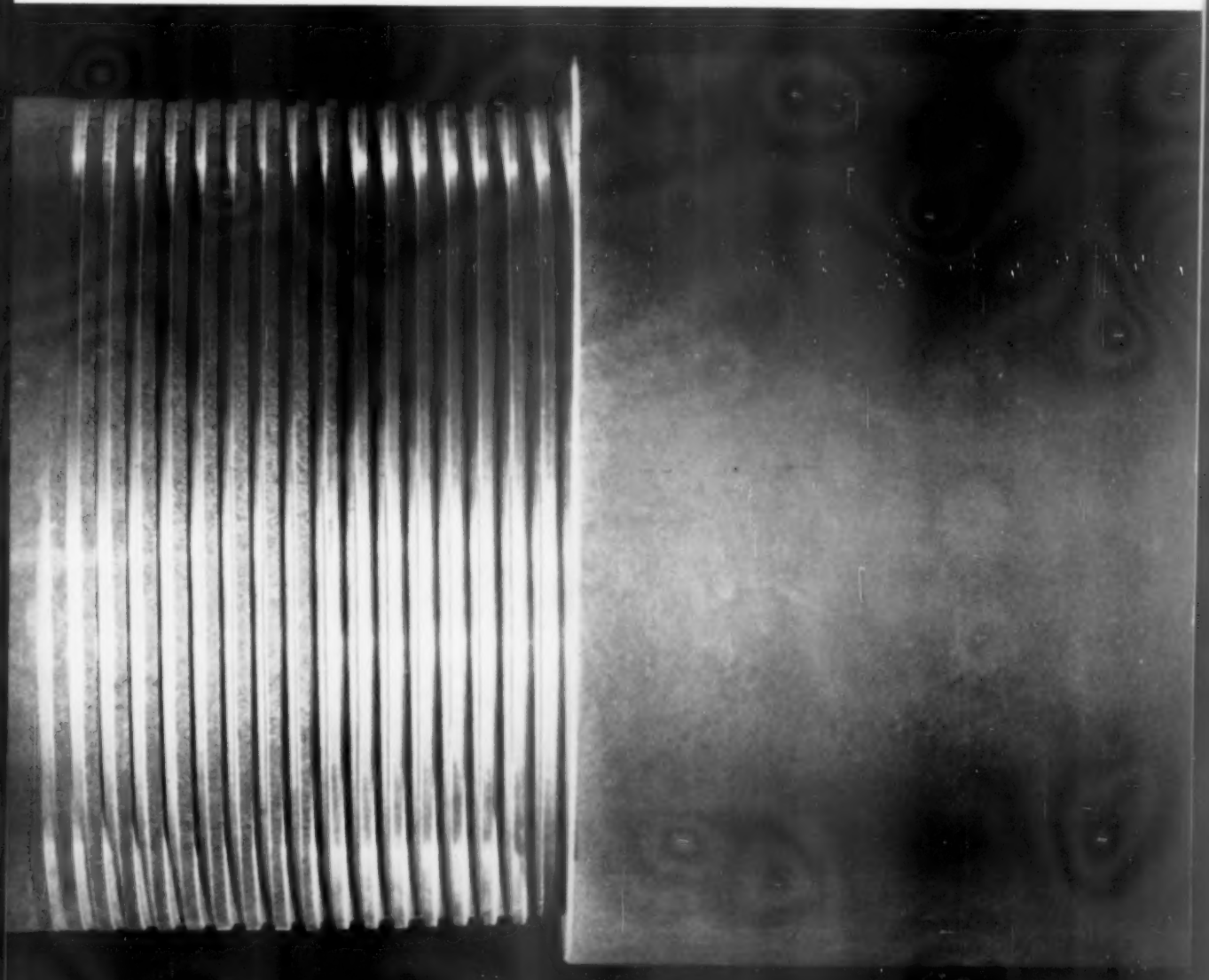

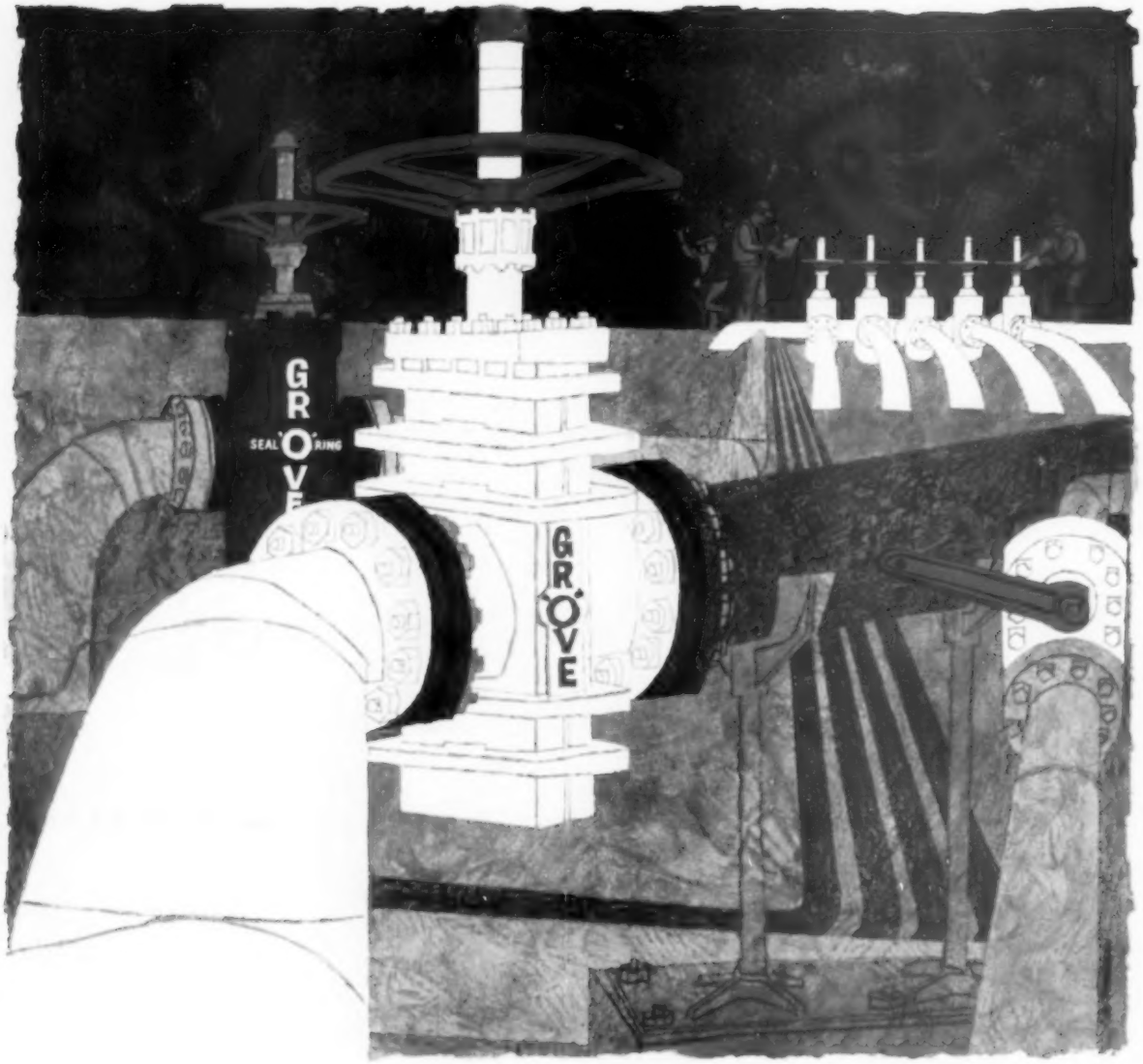

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How to Prevent, Control Blowouts

Training in specific procedures for meeting and correcting the conditions of real and threatened blowouts will lead to the most effective blowout prevention and control.

That there is much more to this subject than the traditional admonition of "Put the hole on choke and raise the mud weight" was underscored this week by T. B. O'Brien and W. C. Goins, Jr., both of Gulf Oil Corp.

The two men spelled out their views at the spring meeting of the Southern District, Division of Production, American Petroleum Institute, in San Antonio.

Too many times, the Gulf men said, a rational approach to blowouts is blocked by fear—fear that stems from a lack of knowledge and leads to guesswork.

They stressed the need for well-planned procedures to prevent and control each blowout situation.

Rig personnel training should consist of two phases, they said.

First would be learning the care, installation, and operation of every piece of blowout control equipment.

Second would be on-the-rig drills in handling potential blowout situations. These would consist of operating and testing the equipment so that each crew member becomes familiar with each piece of equipment and its function and operation.

Then should come a pit drill, in which the tool pusher changes the pit-level indicator to simulate a gain or loss.

The crew then takes the necessary steps to prevent a blowout.

The training should be designed to make full use of the equipment used in blowout prevention.

Various accessory items of equipment, O'Brien and Goins said, such as pit-level measuring devices, mud-weighing instruments, meters to measure mud going in and out of the hole, and degassers, are useful if not essential to safe operation.

The two men put particular emphasis on the value of pit-level indicators, because "very small changes in flow rate can be detected and the volume used to fill the hole while making trips can be measured."

The first step in handling a drilling break is to shut down the pump and determine if fluid is being gained.

If so, said O'Brien and Goins, the hole will continue to flow with the pump off; if not, the mud returns will stop completely.

Should returns continue without the pump, but no mud is gained with the pump on, an increase of not more than 0.4 lb. per gal. in mud weight will be needed to balance the formation pressure.

If the flow stops when the pump is shut down, drilling can continue with no change needed in the mud.

Since a drilling break indicates that at least part of the mud pressure overbalance has been lost, the hole should be checked before pipe is pulled out to change bits, etc., to make sure it doesn't swab.

This can be done easily, O'Brien and Goins noted, by making a short trip—pulling several stands of pipe and running the bit back to bottom and circulating.

If there is a tendency to swab, the hole will fail to make the proper amount of mud, or a severe kick may be noted while circulating after the short trip.

If a change in mud properties other than density does not remedy the swabbing action, the mud weight can be raised 0.1 or 0.2 lb. per gal.

Advantages to this approach, they said, are avoidance of unnecessary increases in mud density, less time consumed in circulating, and much better control, since the crew knows exactly what to expect. Also, by making the short trip the possibility of a blowout while making a trip is reduced.

To prevent blowouts while making a trip, it's necessary that swabbing be avoided and that the hole be kept full of mud.

Swabbing and failure to keep the hole full are the only two things that can cause blowout at this time, O'Brien and Goins reported, since it must be assumed that the mud in use at the time drilling stops has sufficient density to at least slightly overbalance the formation pressure.

Since muds with excessive gel strengths are often the cause of swabbing, O'Brien and Goins recommended that, when these types of mud are used, the solids content be run at the lowest practical level.

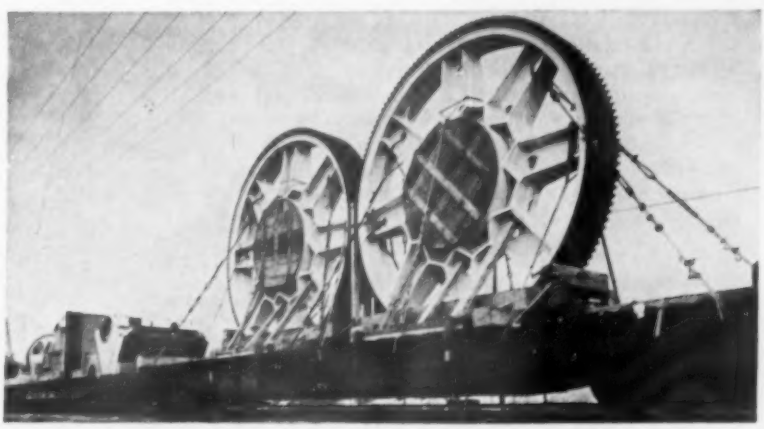
The usual practice of checking the pit level won't always detect swabbing, they pointed out.

Because of this, it's necessary that an accurate determination be made of the amount of mud used to fill the hole each time, and the displacement of the drill pipe being pulled.

As for keeping the hole full, they recommended that it be filled after each stand, or possibly two, is pulled, if swabbing is known to be a problem.

If not, the hole can be filled once for each ten stands in 8⅝-in. holes and larger, and once for each five stands in holes smaller than 8⅝-in.

To protect the hole if a blowout does occur while a trip is being made, O'Brien and Goins said, "The drill-pipe must be as close as possible to the bottom of the hole, because the nearer the bit is to bottom, the less mud weight is required to kill the



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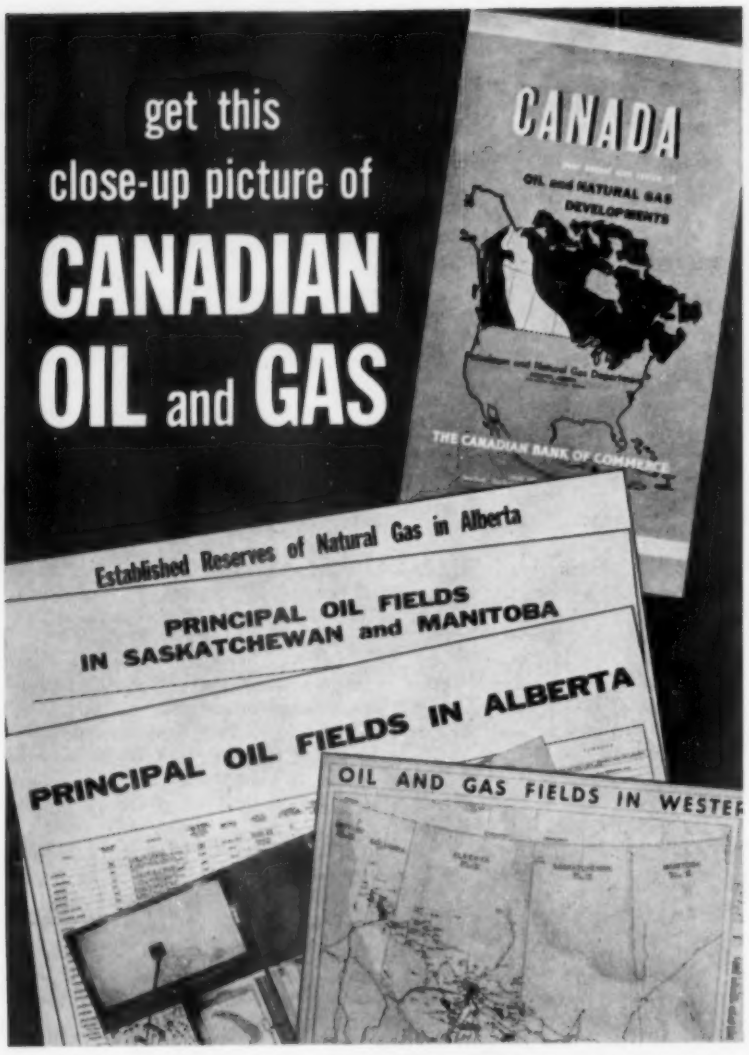

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blowout. Thus, the danger of formation breakdown is minimized."

The manner in which the blowout preventers are closed is just as important as the act of closing them when a blowout threatens during drilling.

The blowout preventer system, reported Goins and O'Brien, should be maintained with one flow line and one choke open during drilling. (To prevent plugging, pump through both frequently.)

This arrangement will allow closing in the hole in easy stages—blowout preventers, the flow line, then the choke. While this is being done, the pump is being shut down, but the drill pipe is kept in motion.

The entire operation should take no more than one minute, or two at the most.

There are two advantages in following this method: (1) If the kick is severe, mud rising in the annulus will have considerable force and can loosen flange bolts if the hole is closed in suddenly; and (2) if the pump is not shut down, enough pressure can be formed to break the formation and cause lost circulation.

Once the hole is closed in, it's imperative, they said, that it be reopened on choke and the pump be started as soon as possible.

To kill blowouts, a five-step procedure is recommended by O'Brien and Goins.

(1) Stop pumps and immediately close in the hole.

(2) Read drill pipe and annulus pressures.

(3) Open the hole on choke of such size that, with the pump running at a reasonable and constant speed, the choke pressure will be about 200 psi. above the initial annulus pressure.

(4) From this time, keep the drillpipe pressure constant, by making changes in choke size as necessary. The choke pressure can be ignored unless it gets high enough to burst the casing; then, and only then, should corrections be made in the drillpipe pressure.

(5) Mud weight required to kill the blowout should be calculated, using this formula: Mud weight required equals mud in use, plus drill pipe pressure divided by .052 times the depth.

As the mud weight is increased, corrections should be made in the drillpipe pressure, which will decrease as the mud weight is increased.

When the mud weight has been raised to the required level, the drillpipe pressure should be that normally required to circulate at the pumping rate used.

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PUMPING NEWS

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Used where the lower zone presents gas or corrosion problems. Both zones may be vented or treated.

As early as 1953 Axelson had a well-established Two-Zone Service Department when Texas was averaging less than 300 multiple completions per year. Now, with multiple completions up 65% over 1958, and running as high as 2200 per year in Texas, Axelson continues to expand its staff of full-time field specialists and engineers to handle the upswing of this type of completion.

Much has changed. Completions that once presented problems and seemed impractical are now considered routine due to Axelson's experience and advanced engineering design. Past complexities have been simplified and Axelson's know-how, specialized equipment and experience are available to all. Axelson's Two-Zone Department, now called Special Products Department, covers every multiple zone producing field in the United States and deals with both new completions and existing installations. They are also available to make recommendations on triple completions and slim hole duals or any phase of special multiple completion engineering.

Although their primary function is designing setups for multiple zone completions to take advantage of the production economies afforded by Axelson Two-Zone Pumps, Axelson experts work out production problems and make recommendations where one zone may be producing gas and the other oil, or where one zone is flowing and the other is pumping.

Axelson Two-Zone Pumps provide a practical, economical method of producing from two zones at once without commingling the fluids. Only one surface pumping unit is required, with a single rod string. All pump parts, with the exception of the cross-over assemblies, are standard, field proved parts, and the Two-Zone Pump itself is an insert-type pump, completely retrievable. A metal-to-metal seal is used for long life and dependability.

While the pumps themselves might be termed standard units, no multiple-zone completion can be called standard. No two wells present the same conditions, so each Axelson dual zone installation is in effect custom designed.

When an Axelson two-zone specialist is called in to discuss a multiple zone installation, he takes into account: pump depth (for both zones), casing size and length, tubing, water cut, gravity of the oil, desired production and the gas/oil ratio. The surface pumping unit—peak load and torque ratings, stroke length and maximum cycle, size—also enters the calculations, as well as such special conditions as sand, viscous fluid, and corrosion. He can also recommend the best tubing string design, the prime mover, surface pumping unit, packer type and rod string.

When the installation is made, he will supervise it at no extra charge—set the pumps and packers, and be on hand for the initial pump running—to make sure you have an efficient, economical production setup.

Call in your Axelson specialist and let him work with you in engineering your multiple zone installations. If you are contemplating a multiple zone flowing well, the Axelson specialist can install the correct cross-over now—and you won't have to pull tubing when you run the two-zone pump later!

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

Earth Sciences Organization Planned

The 14,000-member American Assn. of Petroleum Geologists will be asked at its annual convention next month to back sweeping reorganization plans for the American Geological Institute.

W. B. Heroy, Jr., Dallas member of an executive committee charged with directing the reorganization of AGI, said last week that AAPG support, as well as that of 13 other AGI member societies, is necessary for dissolution of AGI and formation of an entirely new association.

Heroy said AAPG's large membership makes it a key group in the planning. It will meet in Atlantic City, N.J., Apr. 25-28.

The proposed new society, for which a constitution and bylaws were prepared at a recent Washington meeting, would bring all geological and related groups into a professional earth scientist organization.

"The new organization will be stronger than AGI, and have a tight code of ethics and membership rules, which would help identify and protect qualified geologists," Heroy said.

•

The Russians claim they have developed a fully mechanized electric-drill rig which is operated by a three-man crew.

The Soviet news agency Tass reported that field tests of the unit have started in Grosny. The agency said the three workers are needed to man electronic control panels and that no other manual work is required. The report added that round trips are made twice as fast as with usual methods.

•

A federal court judge has dismissed a suit challenging the Bureau of Land Management's cancellation of 86 oil and gas leases in Wyoming.

At the same time, however, U.S. District Court Judge Ewing T. Kerr declared that BLM had violated the law by cancelling the leases through administrative action, rather than by court order.

Kerr dismissed the case, brought by Pan American Petroleum Corp., on the ground that the Secretary of Interior was not made a defendant in the action.

BLM began the action last January by attempting to cancel the leases, which it claimed were held by Walter Davis, Casper oilman, in violation of federal acreage limitations.

Pan American, which subsequently obtained one or more of the leases from Davis, sought to enjoin BLM from proceeding with the cancellation, claiming the bureau had no authority to proceed administratively to cancel or forfeit the leases.

•

Sunset International Petroleum Corp. has entered the California real estate field in a big way.

The company paid $7.5-million for San Carlos, a San Diego subdivision, and Tavares Development Co. The 8,000-home subdivision is one of the largest planned communities in the country. Tavares, which becomes a Sunset subsidiary, will operate the real estate division.

•

The Texas Attorney General maintains that the state can tax production of "dedicated" natural gas even though it will move into interstate commerce.

The official, Will Wilson, made the statement as briefs were filed last week in a consolidated test case involving six companies who are attacking the constitutionality of Texas' new "severance beneficiary" gas tax.

District Judge Jack Roberts is expected to rule in the case by May. The state had expected to receive $7.5-million annually from the new levy. But most payments made since the levy became effective last September have been made under protest. Suits have been filed for refunds.

•

Another Canadian company has been awarded an exploration permit for helium in Saskatchewan.

United Canso Oil & Gas Ltd. was granted the 3½-year permit for 88,160 acres in the Vidora-Consul area.

United Canso, largest gas producer in the province, is the eighth firm to receive a helium permit in recent months (PW—Feb.26'60,p32).

•

A Denver partnership has applied for a 60,000-acre oil-shale lease in Wyoming. If granted, it would be the first in the state.

The firm, Hillis & Wagner, is asking for a lease on a portion of land designated for the proposed Seedskades reclamation project in Sweetwater County.

•

Southern California Petroleum Corp. has sold most of its producing oil and gas properties to Morrow Oil Co. and others for $1.8-million in cash and $2.5-million in oil payments.

Tyler F. Woodward, Southern California president, said the company also would reserve all deep rights to the properties.

•

Federal regulations for Canada's northern Territories and the Arctic Islands will apparently be issued in two stages.

D. E. Lewis, of Imperial Oil Ltd., and chairman of the Canadian Petroleum Assn.'s Northwest Territories Committee, told CPA at its annual meeting last week that release of regulations in two stages may speed up activity in the far north.

Lewis said the first set of regula-

Japanese Company To Drill in Alaska

A Japanese company will team with an American firm to explore jointly for oil in Alaska this year.

George Grimes, president of Polaris Exploration Co., says an agreement has been concluded with Teikoku Oil Co. of Japan. Grimes reports that a 12,000-ft. test will be spudded before the end of the year, probably in the Cook Inlet area, with the Copper River Basin and the Alaska Peninsula-Bristol Bay area other possibilities.

Teikoku will furnish the rig, and Polaris will operate, says Grimes.

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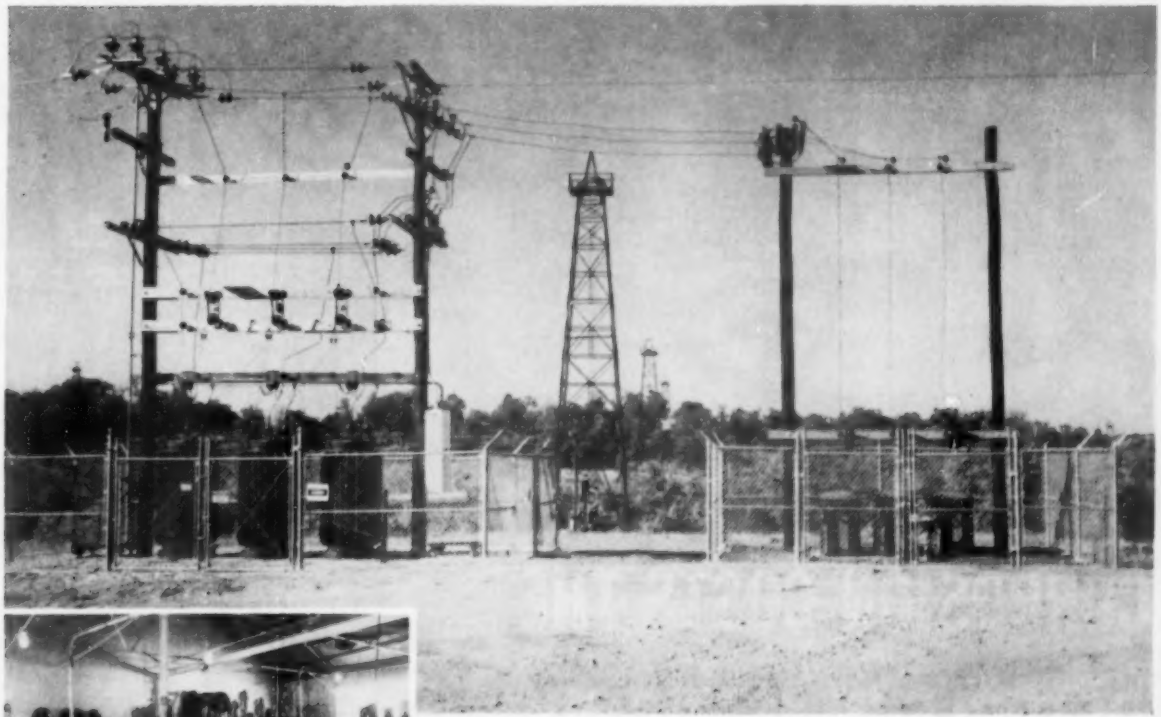
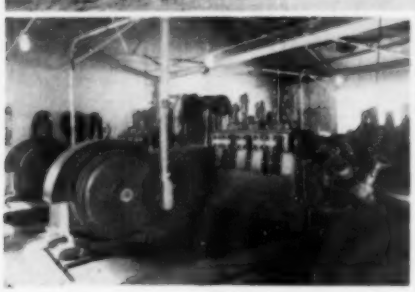


Substation for purchased electric power on waterflood project.



Substation above supplies current for these two big electric motors driving pumps for waterflood project.

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The versatility of utility electric power makes it ideal for many types of application in production, pipelines or refineries.

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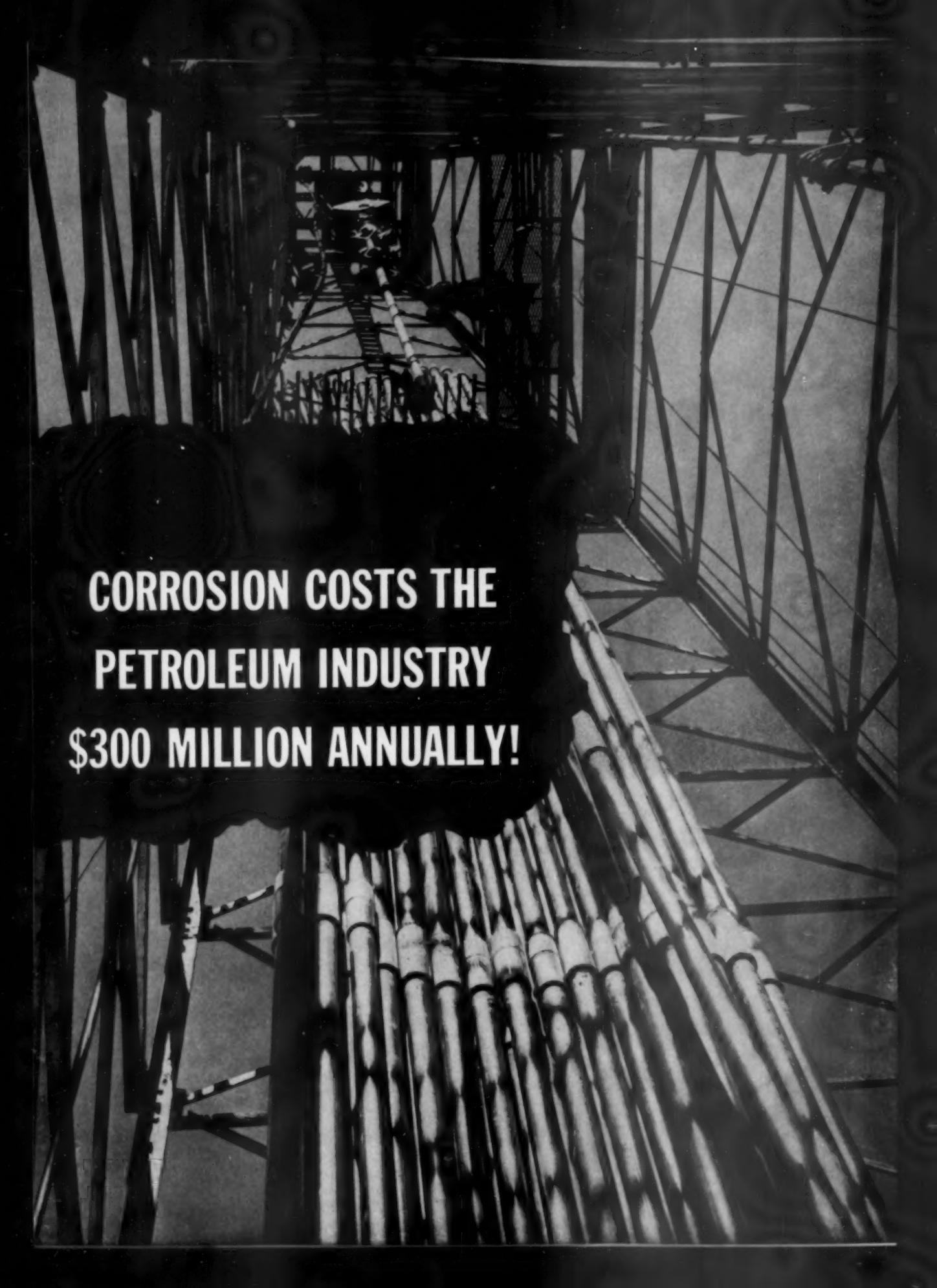
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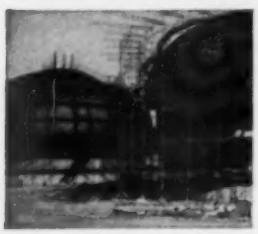

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tions will make it possible for companies interested in the Arctic Islands to at least receive permits.

It's understood that regulations for the Territories will apply to the Arctic except for certain details and differences which will take into account special problems posed by the Islands.

•

Only a bit less than half the total acreage offered at the regular March sale of leases on Colorado state lands was leased.

Bonuses for the 31,984 acres leased —of a total 64,709 offered—totaled $52,956. Of the 91 tracts leased, 44 went for no bonus. High bid was $16.07 per acre, by Champlin Oil & Refining Co., for a tract in section 36-8n-56w, Weld County.

•

The Interstate Oil Compact Commission has received an application for associate membership from Idaho.

Gov. George Docking, of Kansas, chairman of IOCC, says formal action on the application will be taken at the midyear meeting of the association at Detroit, June 13-15. Admission of Idaho would make a total of 30 member states and 3 associate members in IOCC.

•

Drilling Highlights

Alberta—Pan American Petroleum Corp. No. 1-A Bigstone, lsd 5-8-61-22w5, in the Berland River area, flowed gas at the rate of 6-million cf/d on drillstem test at 11,174-200 ft. in the D3 member of the Devonian. The wildcat, which is scheduled to 13,000 ft., is 14 mi. northeast of the big Berland River gas discovery made by Shell Oil and British American in the same formation.

Also in Alberta, California Standard Co. and Shell Oil Co. of Canada No. 16-6 Moose Mountain, lsd 16-6-23-6w5, flowed 5-million to 10-million cf/d of gas through undisclosed choke, and perforations at 7,376-769 ft. in the Mississippian. Nearest production is about 15 mi. northeast at Jumping Pound field.

Arkansas—Donald S. Blair No. 1 Fee, section 31-16n-16w, Searcy County, bailed 30 gal. of 42-gravity oil and 35 gal. of water from 610 ft. in the St. Peters sand. The hole, originally drilled for water, is scheduled to go to 700 ft. in the Everton. It is 150 mi. north of nearest oil production and 45 mi. north of nearest gas production.

East Texas—Shell Oil Co. et al No. 1 V. B. Allsup, B. F. Lynn survey, 2½ mi. southeast of Bryans Mill townsite, flowed gas at the rate of 3.9-million cf/d plus 200 bbl. of condensate per million through 20/64-in. choke and perforations at 10,297-352 ft. and 10,358-67 ft. in the Smackover (Jurassic). Nearest Jurassic production is 20 mi. south at West Linden field, where production is from the Cotton Valley.

Texas Panhandle—Texas Gulf Producing Co. No. 1 Bobbitt, section 95, block 2, TT survey, Carson County, was completed for 9.5-million cf/d of gas through perforations at 3,247-400 ft. in the Brown dolomite. The wildcat is 7 mi. southwest of Panhandle field.

Oklahoma—Ambassador Oil Corp. No. 1 Roman Fixico, section 32-12n-9e, Okfuskee County, flowed at the rate of 237 b/d of 40-gravity oil through 20/64-in. choke and perforations at 3,366-68 ft. and 3,378-85 ft. in the Gilcrase sand. The test is 2 mi. southwest of Castle field.

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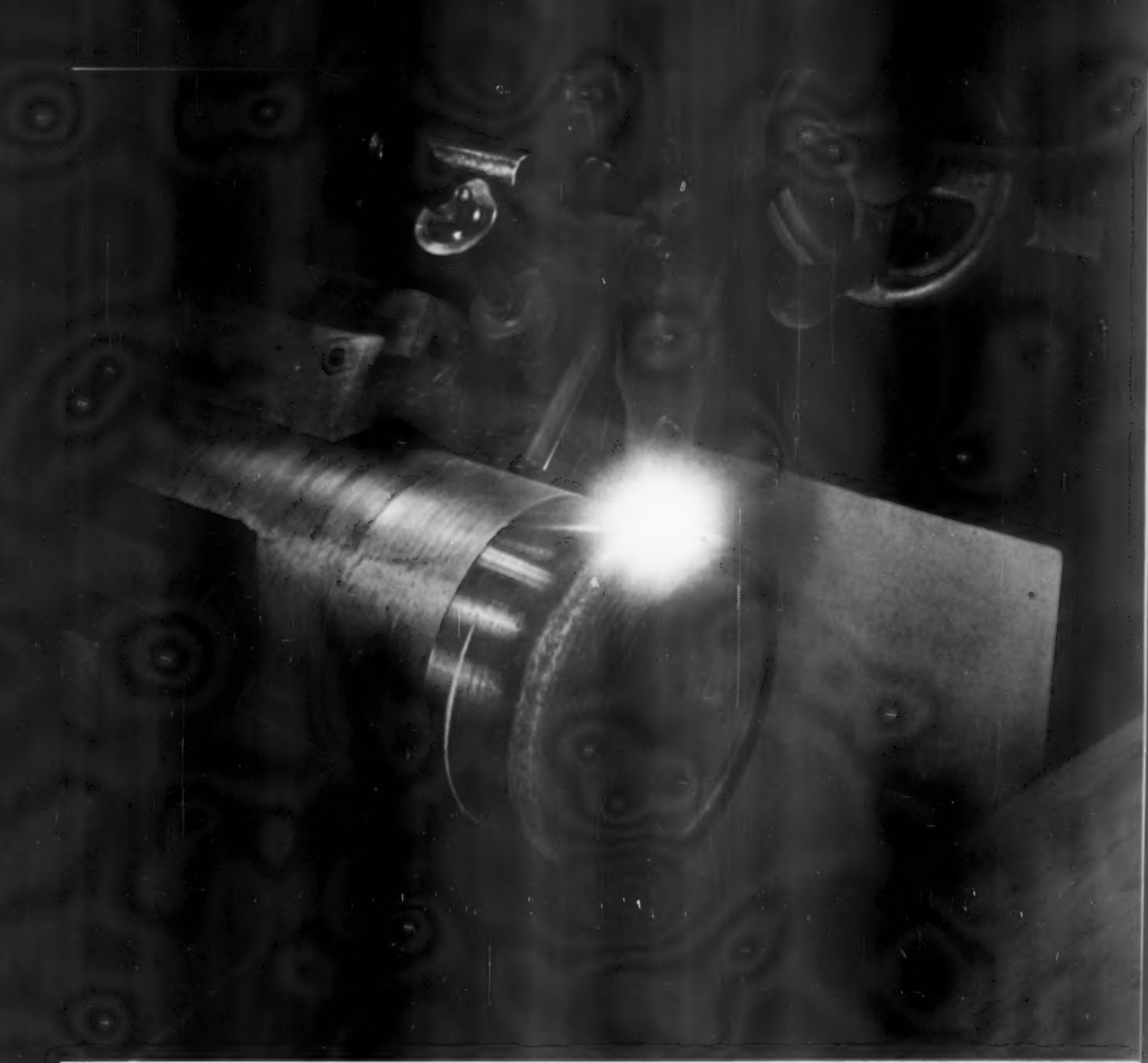

#3 Spang offers the best selective protection against abrasion and corrosion

SPANG HARDFACING (above) is a superior protection for tool joints in abrasive formations. It consists of multiple bands of tungsten carbide, *continuously* overlapped on the joint to form a solid particle-to-metal band. Method of application is the tungsten inert gas welding process.

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#4 Spang consistently sets the performance standards by which all other tubular products are judged

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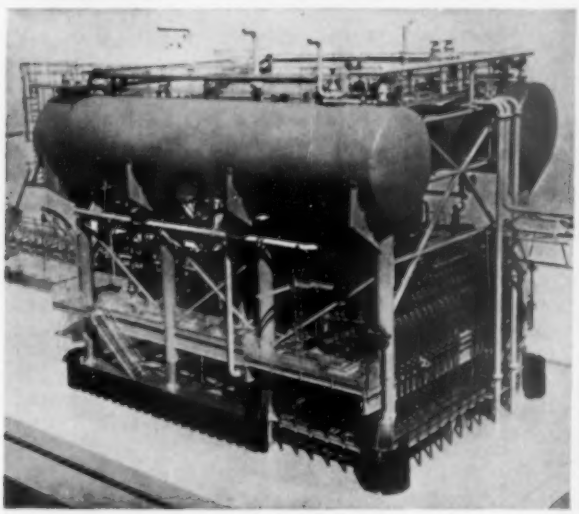

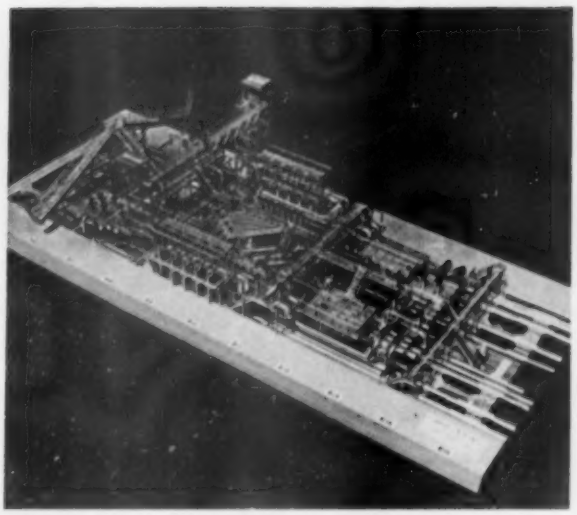

SCALE MODELS of separator unit of flow station (left) and tanker loader (right) have proved that . . .

Small Models Result in Big Savings

- **Superior Oil estimates that model will cut costs of its new offshore flow station by about $50,000.**
- **Shell of Venezuela reportedly saved four times the price of a model used to build a tanker loader.**

Scale models of new transport installations are resulting in big savings by revealing costly design errors before they are built into the final project.

Use of scale models to correct expensive design mistakes has been a common practice in refinery construction for some time. It's a relatively new development in the building of transportation facilities, however.

A scale model of an offshore flow station (picture, left), built by Pipe Line Technologists, Inc., for Superior Oil Co. of Venezuela, is expected to trim the final cost of the installation by about $50,000.

The flow station will be installed by Superior in Lake Maracaibo to separate gas from the crude from 24 wells. The huge station will rest on a foundation in 90 ft. of water.

The station will consist of two main structures: a 58x70-ft. gas separator, and a 50x60-ft. pump unit.

After the gas is extracted, the crude will move by pipeline to the pumping unit. From there, pipelines will carry it to tanker loading facilities.

A 100-ft. truss bridge and walkway will run between the two structures and support the connecting pipeline.

The scale model has enabled Superior to eliminate unnecessary steel supports in the design of the station —the main cost saving—and to improve the locations of valves and other equipment.

The model is 1/32 of the actual size of the station. It was built from blueprints of the station, and contains every component that will go into the actual installation.

After comparing model and drawings, Superior found that heavier steel than was required had been specified for parts of the superstructure, that some of the valves were located so that they would be out of reach of men on the platforms, and that the pump station itself was inconveniently located.

The model also showed up "interferences," which are points where pipes run against one another. These points of "interference" are not always evident on the drawings.

Pipe Line Technologists says the cost of the average model runs between 1% and 1.5% of the cost of the actual facility.

The consulting firm says that the cost of the flow station model ran in "five figures."

Cost of the completed flow station is estimated at between $2-million and $2.5-million.

These figures indicate that the model cost somewhere between $20,000 and $37,500.

Pipe Line Technologists says that it believes the model is the first ever to be built of a flow station. It's not the first model of any type ever to be constructed by the company, however.

Shell of Venezuela has just put into operation a tanker loader at its new Puerto Miranda terminal, which was built from a Pipe Line Technologists model (picture, right).

The technical firm says that this model resulted in savings in steel costs amounting to "four times the price of the model." It would not give the price of the model, however.

The new facility is able to load seven tankers simultaneously with eight different grades of crude. Its loading capacity is 500,000 b/d.

Puerto Miranda is at the mouth of Lake Maracaibo. All of Shell's Maracaibo production now moves through the new terminal for shipment to other points.

The tanker loader model was also used to train the men who now operate it, according to Pipe Line Technologists, and the flow station model is now being used as a teaching aid.

The company adds that models are also valuable in giving the contractor a three-dimensional picture of the actual installation before he starts to build it.

Plans Advance for Nuclear Sub Tanker

Development of an atomic-powered submarine tanker to provide low-cost transportation under the Polar ice for Arctic crude, if and when it's produced commercially, is making strides in several countries.

Efforts to develop a nuclear-driven submarine tanker are keeping pace with exploration in the Arctic Islands, according to a recent report by William H. Patterson, president of Trans-Western Oils, Ltd.

The islands, which include more than a half-million square miles of land area north of the 61st parallel, are thought to be rich in oil (PW—Jul.4'59,p20).

If oil is discovered, producers will face the problem of shipping it to world markets economically. An atomic-driven sub tanker, several oil and engineering companies feel, is the answer. Main reasons are that such a vessel could travel at a much greater speed than a conventional tanker, and could chop hundreds of miles off distances to several markets (PW—Jul. 10'59,p42).

Plans are under study for submarine tankers with capacities ranging from 20,000 tons to 100,000 tons, and speeds of from 20 knots to 40 knots.

The range of designs and specifications is already great.

Meanwhile, advances in nuclear knowledge are cutting the cost of constructing a reactor—the essential power unit in any atomic-driven vessel.

There's no question now that a working atomic submarine tanker can be built. Its construction, however, will depend on reducing the reactor cost even further.

General Dynamics Corp. has drawn specifications for the Maritime Administration for tankers of 20,000 tons and 30,000 tons.

Both ships would have a speed of 20 knots—faster than that of any tanker in use today.

Both would have loaded drafts of 34 ft., shallow enough to enable the ship to dock in over half of the major ports in the U.S.

The 20,000-ton tanker would be 530 ft. long, and the 30,000 tonner would be 675 ft. long.

General Dynamics has also worked on a 40,000-ton tanker. It would have a speed of 37 knots. Its draft, however, would be 67 ft.

The 40,000-tonner was studied, according to the company, "to show the approximate upper limit of feasible speed and cargo deadweight within the scope of present day technology."

Mitchell Engineering, Ltd., of Great Britain has designed a 50,000-ton nuclear-powered sub for the possible transport of iron ore from Ungava, Northwest Territories.

The design, however, is also believed to be suitable for a vessel which would carry crude or gas liquids, according to Mitchell.

The ship would travel at about 25.5 knots and have a draft of 33 ft.

Power source would be a Mitchell 150-megawatt (thermal) boiling water reactor. It would power three turbines, which would drive a single 25-ft.-diameter propeller.

Another company planning construction of a submarine tanker is Mitsubishi Heavy Industries, of Japan.

The company started with a design for a 30,000-ton tanker (PW—Feb. 15'57,p53). It now envisions the possibility of a vessel of 100,000 tons.

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What's New
IN TRANSPORTATION

A floating terminal for unloading tankers bigger than 115,000 tons has been proposed for Norfolk, Va. If built, it would make Norfolk the only U.S. port capable of handling the new giant supertankers.

The Virginia Port Authority suggested that major oil companies in the area build the terminal.

The facility would consist basically of a floating manifold with connections for flexible hoses. The manifold itself would be mounted on a bottomless barge equipped with flotation tanks. Mooring dolphins would be installed for tankers of every size.

•

Pipeline contractors built a total of 3,317 mi. of pipelines of all types in Canada last year.

The figure was reported by D'Arcy J. Baldwin, past president of the Pipe Line Contractors Assn. of Canada, at the group's annual meeting in Victoria, B.C.

With total mileage constructed at about ⅓ of that built in 1958, 1959 was "an unspectacular year," Baldwin said.

He added, however, that he expects construction activity to climb this year.

•

Trunkline Gas Co. has sought an annual rate increase of $5.4-million from the Federal Power Commission.

Biggest customer to be affected by the boost would be Panhandle Eastern Pipe Line Co., Trunkline's parent (PW—Feb.26'60,p46).

The 8.4% increase would also affect 25 wholesale customers in 6 states.

•

Crude is now moving through Marathon Pipe Line Co.'s new 8-in. pipeline from Mosherville to Samaria, Mich.

Marathon built the 57-mi. line to provide an outlet for the Scipio, Albion, and Pulaski fields in southern Michigan.

•

A $5-million products terminal for tankers is being planned for Long Island.

The 2.5-million-bbl. terminal would be built near Port Washington by Lewken Corp., a new company, if a strongly opposed zoning variance is granted.

Special Report: EXPLORATION

April 22nd Petroleum Week

Exploration people are the most optimistic in several years.

After several years of below-normal exploratory activity domestically, there are good indications on the horizon that 1960 will be a turning point.

- Several contract geophysical concerns report that they are putting idle U.S. crews back in the field.
- A few of the oil companies have increased their exploratory budgets for 1960, following the stringent cost-cutting years of 1958 and 1959.
- There will be a general levelling off of exploratory work overseas, but relatively few companies anticipate drastic cut-backs over-all.
- Managements of some companies are becoming apprehensive over the lack of new oil being found domestically; they say they are going to be looking harder for new oil finding tools.
- Basic research – which could have anything as its objective – is going to be emphasized more during 1960. But applied research isn't being overlooked either.

The real breakthrough sought for an effective new oil finding method could come this year – through refinement and better understanding of an existing tool, or through the development of some new concept.

Some straws in the wind: Continued miniaturization of tools; increased use of electronic computers; logging devices which provide closer coordination between geophysicist, geologist and reservoir engineer.

All these and more will be investigated and evaluated in Petroleum Week's 1960 Exploration Report, out April 22nd.

The Special Report on EXPLORATION in the April 22nd Petroleum Week will provoke interest in and produce action for advertisements in that issue featuring products and services with application in exploratory activities.

CLOSING DATE: APRIL 1st

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NEWEST PRODUCTS LINE of Buckeye Pipe Line Co., linking Wayne and Owosso, Mich., runs through heart of small village.

Sharp Growth Seen for Products Lines As Over-All Demand Continues to Climb

The products pipeline industry faces the prospect of another good decade. These are the forecasts: A sharp rise in throughput, and steady growth—possibly punctuated by a few dramatic projects—in new line construction.

This is the consensus of many key industry leaders queried by PETROLEUM WEEK.

All agree that pipelines will play an even bigger role in transporting products from refinery to market than they did in the last decade—one in which throughput registered record growth.

The general feeling of pipeline industry executives is optimistic—tempered, however, by the realization that competition from other means of transportation will toughen as pipelines sharpen their bid for a bigger share of the market.

Their view is that the present web of products lines can continue to be spun out as long as there are markets to snare with the bait of lower transport charges.

The industry's basic optimism is tersely expressed in this statement by a top official of one major oil company: "Pipelines will continue to play a big part in transporting products, and to take business away from the railroads and trucks. When the price of poker keeps going up in this country, you've got to cut costs by hook or crook."

The pipelines' share of total U.S. products movement has increased steadily since World War II (chart, page 61). In 1946, 10.3% of all products moved by pipeline, according to figures compiled by the Committee for Oil Pipe Lines. By 1958, pipelines' percentage had risen to 20.5%.

No statistics for 1959 are available yet. But it's pretty well agreed in the industry that pipelines are continuing to increase their share of total products movement.

Pipelines' gain over the years has been largely at the expense of the railroads. The railroads' share of the products haulage market plunged from 30.4% in 1938 to 5.3% in 1958. Pipelines passed the railroads for the first

time in 1949, when their respective shares of the market were 12.5% and 11.7%.

Since 1949, the water carriers have also sustained a loss each year, but they still have a considerable lead on pipelines.

Only trucks have continued to gain along with pipelines.

Throughput this year—and during the coming decade—could increase at an even higher rate, however, if the estimates of several companies as to the volume of products they will move by pipeline hold true and set a pattern for the industry. Current forecasts by the companies of their 1960 throughputs show increases of from 3% to 60% over 1959.

In hearings before the House Armed Services Subcommittee last year, it was brought out that the volume of crude moved by pipeline is expected to level out in the future.

At the same time, according to W. S. Spangler, vice-president of Humble Pipe Line Co., evidence produced at the hearings led to the conclusion that "a products pipeline push is under way."

Texas Eastern Transmission Co. reports that it expects to increase the 39.9-million bbl. carried in its Little Big Inch line last year by 50% to 60%.

Of TET's 1959 total, 50% was gasoline, 40% fuel oils, and 10% liquefied petroleum gas. The company says that the proportions should be about the same through 1960.

Texas Eastern's 1,168-mi. system extends from Houston to Moundsville, W.Va., with a spur to Chicago. Present capacity is 185,000 b/d.

Of the products now carried by TET, jet fuels are expected to record the most startling growth. At present, between 60,000 bbl. and 70,000 bbl. of jet fuel are moved every month. "In three to five years, the shipments of jet fuel will be several times what they are now," says Millard K. Neptune, senior vice-president, "The surface has only been scratched as far as the civilian jet fuel business is concerned."

Even the more modest throughput increases of from 3% to 11% anticipated by other companies would result in a record decade, if they pace the industry.

A major common carrier, whose line links eastern refineries and principal midwestern markets, is figuring on a 10.7% rise in throughput this year over last. In 1959 the company transported 181,806 b/d. In 1960 it expects to move 201,300 b/d. And it sees no reason why its growth should stop there.

Phillips Petroleum Co. forecasts that throughput of its products lines this year will total 75-million bbl., a 5% rise over last year's 71,540,000 bbl. Of last year's total, 60% comprised gasoline, 25% distillate, and 15% LPG. The percentages aren't expected to vary much this year.

Standard Oil Co. (Ind.) expects products deliveries through its private pipeline system to grow by 3.2% this year over 1959. Last year the system moved about 64-million bbl., and this year it should carry some 66-million bbl.

By 1964, Standard forecasts, throughput should be 71-million bbl., and by 1970 it should hit 80-million bbl.

Standard reports that last year it transported 41-million bbl. of gasoline, 21-million bbl. of heating oils, and 2-million bbl. of miscellaneous products. The 1960 increase is expected to be equally divided between gasoline and heating oils. Beyond this year, Standard says, gasoline and miscellaneous products—most notably jet fuel—will provide the main impetus to growth.

A major oil company, whose 1959 throughput was about 108,000 b/d, expects to carry approximately 113,000 b/d this year. The company, however, isn't unreservedly optimistic about volume increases throughout the entire decade. It injects the only dark thought in an otherwise bright picture. "Assuming there will be no more depressions—and this is a big assumption—the flow through our lines should increase by 3% to 4% annually," a top official says.

How Much Line Building?

From the standpoint of construction, 1960 may be a banner year—or the number of miles of new pipeline built may fall well below the 1959 level. There's one big "if."

As of Dec. 31, 1959, the Bureau of Mines estimates, there were 44,483 mi. of products lines in the U.S.

This represents an increase of 8,063 mi. over 1956, the last year that the bureau officially recorded the total.

If the Missouri-Kansas-Texas R.R. goes ahead with its proposed two-pronged, 2,317-mi. line from West Texas to the Upper Midwest, the total of new products lines constructed in 1960 could reach nearly 3,000 mi.

The line would extend about 500 mi. from Midland, Tex., to McPherson, Kan., where it would fork to Madison, Wis., (550 mi.) and Minneapolis-St. Paul (450 mi.) (PW—Nov.6'59,p120).

A request for authorization of a public sale of securities to finance the building of the $71,742,500 line was made to the Securities & Exchange Commission late last month (PW—Feb.26'60,p47). Approval is expected soon.

It's not known how much throughput has been committed to the line by shippers to date, but an official says LPG shipments through the base leg alone could reach 60,000 to 70,000 b/d within five years.

The Committee for Oil Pipe Lines estimates that about 500 mi. of new lines will be constructed this year, without the Katy line.

Plans for many small projects were announced last year for 1960 completion. For the most part, they call for only short laterals and spurs.

The latest pipeline planned is one from Glendive, Mont., to Minot, N.D., by the Farmers Union Central Exchange. The 190-mi., 8-in. line would cost about $5-million. Actually, the line will be an extension of an existing line from the Farmers Union refinery at Laurel, Mont., to Glendive.

Plans for a 90-mi. products line from Linden, N.J., to Suffolk County, L.I., have been temporarily shelved. The line would cost $25-million, and its promoters don't feel it could pay for itself in competition with low-rate barge

continued ▸

transport. The high cost of the line would be due to the steep valuations of the land it would cross.

The line was to be built by East Coast Pipeline Co. Among the oil companies that said they might use it were: Sinclair Oil Corp., Cities Service Oil Co., Gulf Oil Corp., Texaco Inc., Mobil Oil Co., and Shell Oil Co.

A spokesman for one of the companies says the line would be uneconomical right now, but that its construction at some later date is inevitable.

Most companies plan to handle their higher throughputs over the next few years by building loops or adding new pumping capacity.

Typical are the plans of Standard Oil Co. (Ind.) and Phillips Petroleum Co.

F. Cushing Smith, general manager of Standard's supply & transportation division, reports, "Most of the increased volume will be moved through existing pipelines, capacity increases being achieved through the construction of additional pump stations and enlargement of existing pump stations."

And a Phillips official says, "Present capacity will be supplemented by necessary loops and pump stations to meet 1960 pumping requirements, but current plans do not include any sizable pipeline construction program in 1960."

A total of 1,278 mi. of new products lines were built last year, and 79 mi. of crude lines were converted to products, at a total cost of $54,380,000, according to the Committee for Oil Pipe Lines.

The most important line completed in 1959 was that of Laurel Pipe Line Co. The line extends 447 mi. from Philadelphia to Cleveland. Owners are Gulf Oil Corp., 40%; Sinclair Pipe Line Co., 35%; and Texaco Inc., 25% (PW—Oct.9'59,p82).

Several other sizable lines were also finished last year. Among them:

- Continental Oil Co.'s 153-mi., 6-in. line from Artesia, N.M., to El Paso, Tex. Capacity is 8,500 b/d, and cost was $2.5-million.
- Kaneb Pipe Line's 279-mi., 6-in. line from Phillipsburg, Kan., to Yankton, S.D., via Fairmont, Neb., at a cost of $6.3-million.
- Buckeye Pipe Line Co.'s 115-mi., 8-in. line from Wayne, Mich., to Flint and Owosso. Capacity is 22,000 b/d, and cost was $3.8-million.
- Great Lakes Pipe Line Co.'s 128-mi., 12-in. line from Iowa City, Iowa, to Middleburg Junction, Ill.
- El Paso Natural Gas Co.'s 97-mi., 6-in. line from Aneth, N.M., to the Chaco products line, at a cost of $2.2-million.
- Texas Eastern's 63-mi., 8-in. line from Tyler to Carthage, Tex., at a cost of $2-million.

More Storage Facilities

New facilities to store the bigger volumes of products also are either under way or being planned.

Continental, together with Wilshire Oil Co., has nearly completed its terminals at Phoenix and Tuscon, Ariz., with capacities of 106,000 bbl. and 70,000 bbl., respectively (PW—Dec.18'59,p52).

Great Lakes Pipe Line Co. expects to start construction this spring of a products terminal at Waterloo, Iowa, which will be supplied by a 58-mi. spur from its main line at Grinnell. When it's completed, Great Lakes will have a total of five terminals connected to its main line in Iowa alone.

Underground storage—particularly for LP-gas—is being expanded too.

At present, the company that is probably most active in developing storage for LPG is Texas Eastern. Late last year TET reported that its Mt. Belvieu (Tex.) underground salt well had been developed to a capacity of 320,000 bbl. Since then, it has been enlarged further, and now can hold 550,000 bbl. At the same time, the capacity of the company's Todhunter (Ohio) underground storage cavern was expanded from 485,000 bbl. to just under 1-million bbl.

Newest project to be announced is Continental's plan to create a 200,000-bbl. underground cavern in a limestone formation near Ponca City, Okla., for storage of propane. Conoco says its LPG sales have been growing steadily, and that this new storage is needed to assure supplies for peak winter demands.

Over-All Throughput to Climb

All products will be carried in greater quantities by pipeline this decade, but certain products—those for which demand is climbing most steeply—will comprise increasingly bigger proportions of the total throughput.

The Bureau of Mines forecasts the following demand rises for 1960 over 1959: gasoline, 3.2%; distillate, 4%; residual, 2.3%; all other products, 7.9%. Demand for kerosine is expected to drop 0.7%.

The bureau gives the following daily demand estimates in barrels for 1960: gasoline, 4,214,000; distillate, 1,907,000; residual, 1,587,000; kerosine, 304,000; all other products, 1,852,000; total domestic, 9,864,000.

Last year, demand in barrels was: gasoline, 4,083,000; distillate, 1,834,000; residual, 1,551,000; kerosine, 306,000; all other products, 1,717,000; total domestic, 9,491,000.

Gasoline and miscellaneous products will continue to comprise the bulk of the products moved by pipeline, the industry feels.

The amount of heating oils carried by pipeline is also expected to grow, but at a slower pace. The reason is the increasing availability of natural gas, which is gaining steadily in the battle for the heating market (PW—Feb. 19'60,p15).

"Volume increases will be largely accounted for by gasoline and miscellaneous products, including jet fuels," predicts an Indiana Standard executive. "The demand for heating oils is not expected to increase as rapidly as gasoline because of increased competition from natural gas."

The president of the pipeline division of another major says, "With the exception of fuel oils and natural gasoline, virtually all petroleum products and natural gas liquids will be carried in increasing amounts by pipeline during 1960, and most likely for several years into the future."

Of this company's total refinery output last year, products were moved by pipeline in these proportions: premium-grade gasoline, 52%; regular-grade gasoline, 51%; No. 1 fuel oil, 48%; No. 2 fuel oil, 43%; natural gas liquids, 40.3%.

This year the company expects to move these propor-

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James W. Harper is manager of Interstate Truck Terminal (Ulmer, S. C.). The place boils with activity 24 hours a day, 7 days a week. More than 50,000 trucks and 20,000 passenger cars a year are fueled. Some of the busiest pumps have served 50 trucks in a 24-hour period.

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Interstate Truck Terminal, Ulmer, S. C. This station has 12 pumps. Restaurant and store are in background; shower, sleeping quarters, lounge and barbershop for truck drivers are in area at right. Photo shows five trucks and one passenger car being serviced at one time.

Attendant fills truck tank with U. S. Royal Hose. Note extreme flexibility and ease of handling.

(at left) Station Manager James Harper shows how previous hose at left was flattened and cut when truck ran over it. **U. S. Rubber hose at right, which has been run over repeatedly, still remains in perfect shape.**

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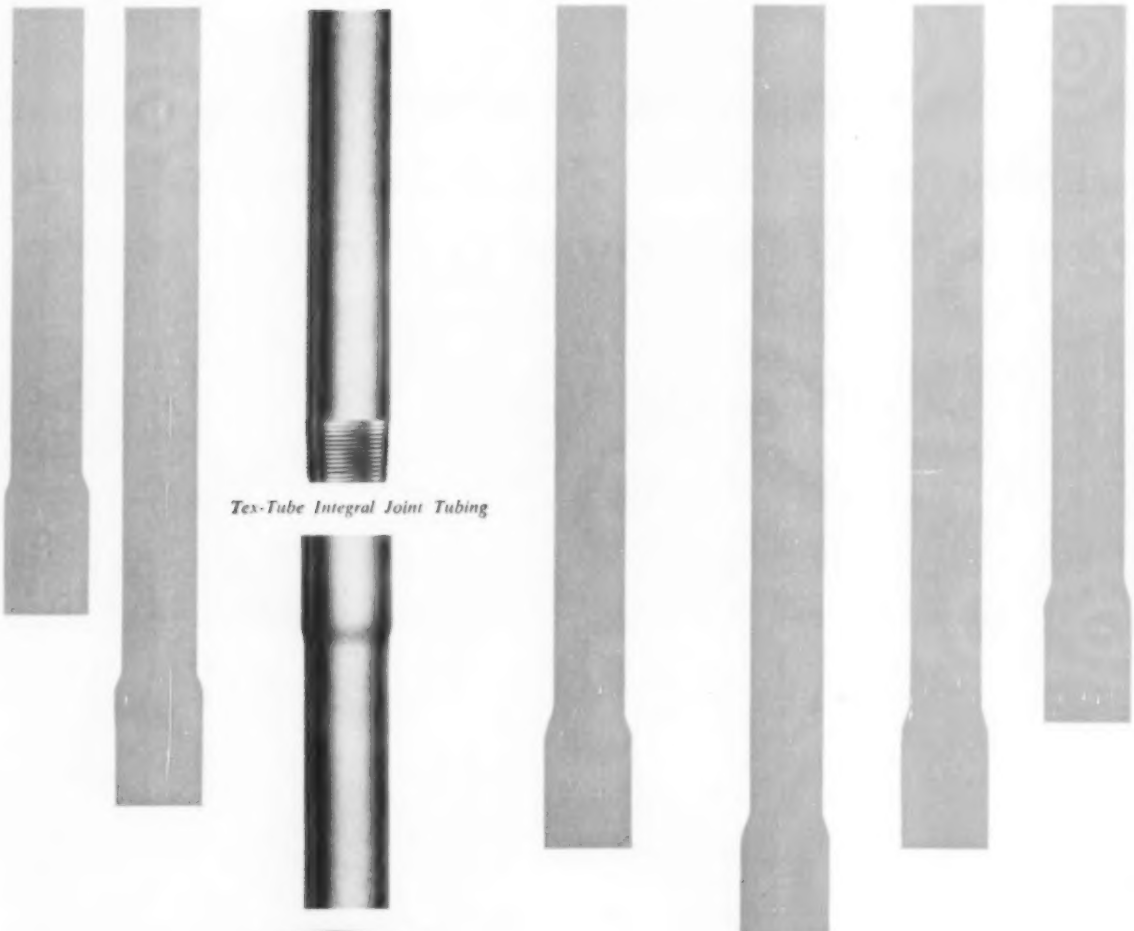

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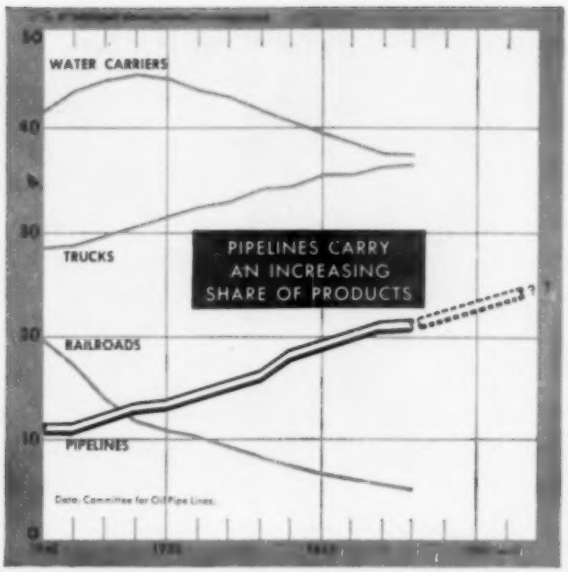

PIPELINES' SHARE of total volume of products carried by all means of transport continues to grow steadily.

TRUCK DELIVERIES of avfuel directly to airports still lead those by other transport means by a wide margin.

tions of its total production by pipeline: premium-grade gasoline, 65%; regular-grade gasoline, 61%; No. 1 fuel oil, 49%; No. 2 fuel oil, 39%; natural gas liquids, 36.1%.

The official explains that the reduction in the amount of natural gasoline that will be carried by pipeline is due to a cutback in refinery consumption of this product.

"The reason for the decreasing volume of fuel oils moved by pipeline is because natural gas is rapidly replacing fuel oil for domestic heating and commercial uses, especially in the East," he says.

Avfuel Volume Will Swell

Pipeline movements of jet and other aviation fuels—both directly to airfields and to outside distribution terminals—are certain to climb steeply this decade.

"It is imperative that every large commercial airport be connected to a pipeline in order to handle the tremendous volumes of jet fuel that are needed," asserts the president of one south-central common-carrier line. "You simply cannot transport enough jet fuel by tank truck."

"The increase in jet fuel business will roughly parallel the increase in jet service provided by the commercial airlines," says the vice-president of another pipeline company.

Pipeline deliveries of avfuel directly to military airfields in the first half of last year comprised 24.6% of the military's total requirements. And the estimate is that pipelines will carry 30% this year.

The first pipeline deliveries directly to air bases were made about five years ago. One of the first was Texas Eastern's line to Barksdale Air Force base, near Shreveport, La., in 1956.

That year, pipelines transported to bases 6.3% of the Air Force's total needs. In 1957, pipelines moved 12.9%, and, in 1958, they carried 17.5%.

Last year, pipelines outstripped railroads and barges in volumes of avfuel transported to military fields, and were led only by trucks. Shares of the other three types of transport in the first half of 1959 were: trucks, 43.4%; railroads, 16.2%; barges, 15.7%.

The Air Force's total avfuel requirements this year are expected to be 140,524,000 bbl., compared with 128,370,000 bbl. in 1959, and 105,979,000 bbl. in 1958.

Several companies are now known to be studying possible new lines to bases not already supplied by pipeline, or undersupplied by existing pipelines. In each case, however, the company declines to discuss its plans for the record, probably because of the highly competitive nature of the avfuel pipeline business.

The president of a pipeline company discloses: "Every major Air Force base is being considered as a potential spot to locate a pipeline. You have to consider Air Force bases—even though you are hampered by the fact that the military can award a contract for not longer than one year—because the military is the single largest customer of the petroleum industry."

Pipelines were completed recently to three civilian fields and to four military bases:

- Humble Pipe Line Co. has opened two short lines of 4-in. diameter from its Irving terminal to Dallas's Love Field. Total cost of the facilities was $330,000 (PW—May29'59,p81).
- Everglades Pipe Line Co. has put in operation its 34-mi., 10-in. line to Miami (Fla.) International Airport. Capacity is 60,000 b/d, and cost was $2¾-million (PW—Oct.2'59,p49).
- Badger Pipe Line Co. has completed its 5-mi., 6-in. line from Des Plaines to Chicago's O'Hare Field. Capacity is 15,000 b/d, and cost was $125,000.
- Buckeye Pipe Line Co. has put in operation its

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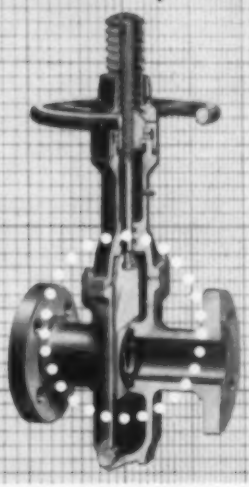

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11-mi., 6-in. spur from its main pipeline to Griffis Air Force base, Rome, N.Y., at a cost of $1.3-million. The main line carries jet fuel to the spur from Linden, N.J. (PW—Feb.20'59,p103).

• Southern Pacific Pipe Line Co. has completed a 15-mi., 6-in. lateral from its main system to Vincent Air Force base, Yuma, Ariz., at a cost of $500,000.

• Okan Pipeline Co. has built a 26-mi. line, with diameter ranging from 6 in. to 8 in., to the Plattsburgh (N.Y.) Strategic Air Command base, at a cost of $675,000.

• Texas Eastern has completed a 28-mi., 6-in. line from its system to Wright Patterson Air Force base, Lebanon, Ohio, at a cost of $625,000.

At this time, there are 31 Air Force bases and 8 Air Force storage terminals connected directly to pipelines.

There are big risks in the relatively small investment of a direct pipeline to an Air Force base, however. Perhaps, the gravest is the uncertainty as to when the U.S. will convert to missile power as its main air strength.

A high official in a common-carrier company that has already connected to several fields and is now bidding for more feels that the military's avfuel needs—as attractive as they are now—will be "short term." Soon, he believes, "the bombers will fade out and the missiles will take over."

He also has some other reservations about serving the military.

"They're stupid in their methods of handling fuel requirements," he says bluntly. "They can't see any difference between an oil company supplying a service for them and a transmission company supplying a similar service. They expect a common carrier to spend money to provide service without assuring the company that the line will be used. The longest contract they'll award is only six months. If we were actually selling our products to them, it might be different. However, we can't build lines to bases without assurance that our lines will be used. This is our only means of income. As a result, we prefer to deal with businessmen rather than military men."

The Military Petroleum Supply Agency, which buys all of the Air Force's fuel, says it's permitted to award supply contracts for a maximum period of a year, but that most suppliers prefer agreements for six month or even shorter terms—because, MPSA feels, the availability of short-term contracts offers the seller greater flexibility in planning.

Direct pipeline links are prized by the military because they provide lower-cost transportation than do other means of transport.

Texas Eastern claims that its line to Barksdale Air Force base has been saving the Air Force about $1¼-million a year in transportation costs since it was opened in 1956.

Texas Eastern says the line has enabled the Air Force to deploy 150 government-owned tank cars for transportation of avfuel to other bases not served by pipeline.

Barksdale's monthly consumption of petroleum products, including ground vehicle fuels, totals some 6-million gal.

Contamination is an acute problem in moving highly sensitive jet fuel through a pipeline. It can be partially solved by "wrapping" the jet fuel slug in gasoline.

"Wrapping" means sending gasoline through ahead of the jet fuel slug to clean the line, and then moving gasoline behind the slug to clean the line of jet fuel.

No matter how careful a company is, however, there is always some contamination of the jet fuel. While gasoline is the best product to use to "wrap" the jet fuel, it seems still to have a greater tendency to blend with jet fuel than it does to mix with other products.

METER AND PUMP STATION of Humble Pipe Line at Love Field, Dallas, can handle 420,000 gal. of avfuel a day.

If the line is properly cleaned, contamination seldom is great enough to throw the jet fuel off rigid aeronautical specifications. Occasionally, however, the blending area is big enough to cut the pipeliner's profit noticeably.

Texas Eastern reports that it charges the same rate for shipping jet fuel as it does for other products, even though the cost of transporting the fuel is higher.

Big Boost Soon in LP-Gas?

Pipeline transport of LP-gas, spurred by increased production, is certain to record solid gains in the coming decade. A big boost in throughput will come in the very near future if Katy builds its proposed line (page 55).

LPG sales last year amounted to 8,693,000,000 gal., according to Phillips Petroleum Co., a gain of 16.5% over 1958's 7,462,000,000 gal., which, in turn, was 7.5% above 1957.

Behind the increases is the widening acceptance of LPG as a domestic, industrial, and agricultural fuel. It's also used heavily in the manufacture of many petrochemicals.

There's a possibility that a 1,900-mi. LPG line might be completed from western Canada to the U.S. Great Lakes area in the next few years. Authority to build the Canadian section of such a line was sought last week by Westalta Pipe Lines, Ltd., from the Alberta Dept. of Mines & Minerals.

Westalta is a subsidiary of Pembina Pipe Lines, Ltd. Original reports from Canada were that the line would be built by Foothills Pipe Lines, Ltd., another Pembina subsidiary (PW—Mar.4'60,p68).

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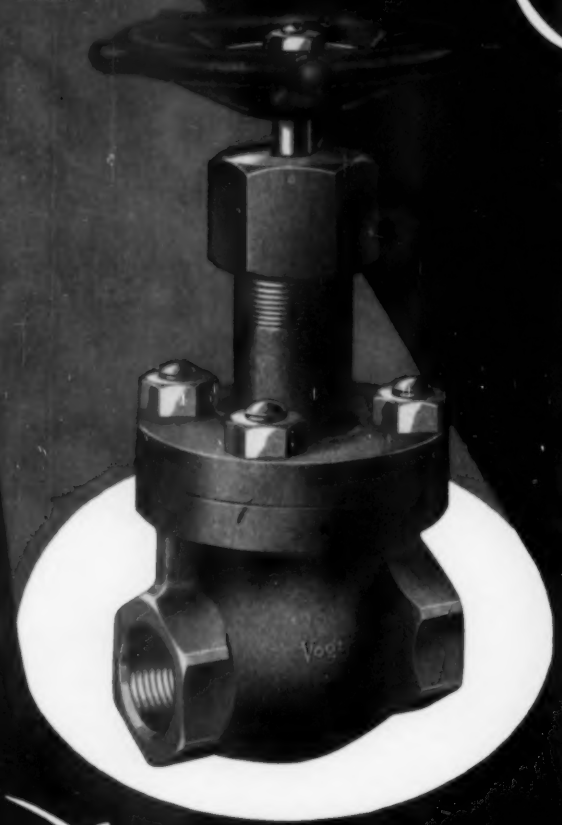

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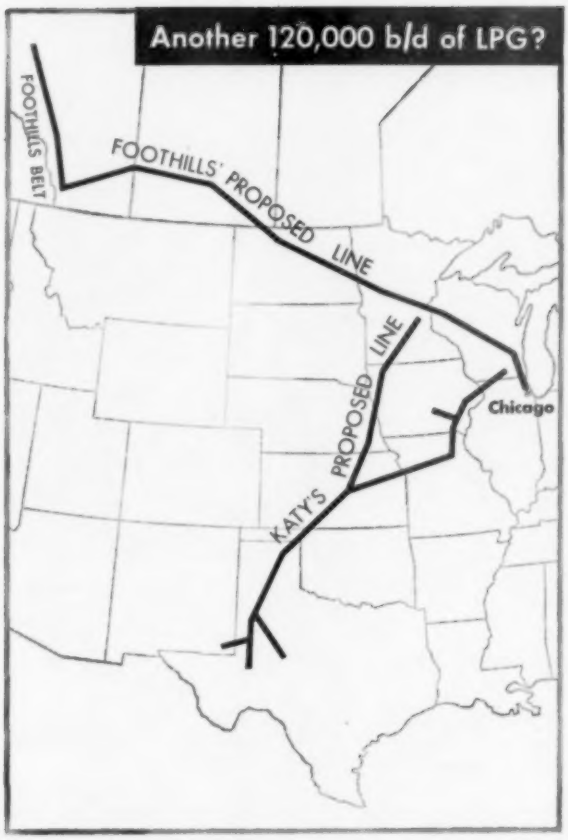

The liquids to be carried by the line would be extracted from gas proposed to be exported from Alberta Foothills "wet gas fields" at the rate of 858-million cf/d (PW—Dec.18'59,p48;Jul.24'59,p35).

The 500-mi., Alberta section of the 16-in. line would cost about $35-million. Until the entire line is completed, Pembina says, the Alberta segment would move the liquids to markets in the province.

Pembina, however, is definitely planning to extend the line all the way to the Great Lakes area. Approval from Canada's National Energy Board to complete it will be sought once the currently proposed natural gas pipelines to the U.S. are begun, according to informed sources.

Canadian producers are eager to secure an outlet in the U.S. for their anticipated surplus LPG. They don't know where else to turn for markets. They estimate that anticipated gas production will yield about 84,000 b/d of liquids by 1962, when the pipelines to carry the proposed new gas exports should be completed. But Alberta's LPG demand won't be much over 20,000 b/d, according to the Canadian Petroleum Assn.

Alberta last year produced LPG at the average rate of 12,000 b/d for a total of 4,140,024 bbl. Of this amount, propane comprised 1,593,189 bbl.; natural gasoline, 1,396,979 bbl.; and butane, 1,149,856 bbl.

No major refinery expansion is being planned in Alberta at this time to handle the surplus.

There's talk in the province that new petrochemicals plants eventually will be built to use the liquids, but no company has announced plans for any as yet.

There is some activity, however, which will lead to limited increases in local consumption.

Authority soon will be sought from the Alberta Oil & Gas Conservation Board by Britamoil Pipe Line Co., Ltd., to build two liquids lines from gas-processing plants to two refineries of British-American Oil Co., Ltd., its parent company.

One of the lines would be 126-mi. long, and would link a plant at Pincher Creek to British-American's Edmonton plant.

The other line, to be 64-mi. long, would connect a plant to be built at Dick Lake Field to the company's Calgary refinery.

Each of the two lines would have a capacity of about 10,000 b/d.

A $4-million refinery of Canadian Oil Companies, Ltd., now nearing completion about 25 mi. south of Red Deer, will take about 4,000 b/d of condensate from extraction plants in the area.

Shell Oil Co. of Canada is believed to be considering the building of a refinery in the province that would handle a minimum of 8,000 b/d of condensate from Foothills fields.

Chemical Lines Stir Interest

Shipment of petrochemicals by pipeline is still in its infancy.

Most of the petrochemicals lines in the U.S. are concentrated in the Gulf Coast area, seat of the country's petrochemicals industry. The lines—all of them relatively short—link producers directly with consumers.

Gulf Refining Co. has the longest petrochemicals line—a 140-mi. ethylene line. It starts at the company's Port Arthur refinery, goes to Port Neches, then branches eastward to customers in the Orange-Port Arthur area and westward to Houston, with a lateral to Texas City.

Humble Oil Co. has two lines, each about 25 mi. long—one for ethylene and the other for propylene. The lines move the chemicals from Humble's Baytown refinery to customers in Texas City.

A high-purity ethylene line has been operated with great success for the past two years by Petroleum Chemicals, Inc., jointly owned by Continental and Cities Service. The 30-mi., 6⅝-in. line was the first ever to be built interstate. It carries the ethylene from PCI's Lake Charles (La.) plant to E. I. du Pont de Nemours & Co. and Spencer Chemical Co. in Orange, Tex.

Interest in the building of more petrochemicals lines has heightened lately, though no company as yet seems intrigued enough by the possibility of lower transport costs to launch a major new project.

Herbert Fisher, president of Pipeline Technologists, Inc., and Kaneb Pipe Line Co., says:

"The field of chemical and petrochemical pipelining is wide open. This industry is now becoming more aware of the fact that savings can be made by using pipelines as a means of transportation. Actually, there are two ways chemical or petrochemical companies can save on transportation costs. First, they can save by transporting

continued ▸

the raw material by pipeline. Second, they can save by transporting the finished and semifinished products by pipeline."

W. S. Spangler, vice-president of Humble Pipe Line Co., is of the same opinion. He says:

"Another growth factor will be the transportation of petrochemicals, such as ethylene, propylene, and benzene. The use of these and other wonders from oil has been expanding rapidly. In the next five years, demand for petrochemicals is expected to increase at a rate approximately double that of total petroleum products. It is believed that pipelines will participate in this advance."

Pipeline executives say they first want assurance of long-term markets and supply sources before they build petrochemicals lines of any substantial length.

"I would say that there is more financial risk involved in hauling petrochemicals," says a spokesman for one major. "But at the same time, I'd say the possible financial returns are greater, too. Gasoline lines serve a lot of customers. If one gets mad, it doesn't hurt you too much. However, if you are serving only one petrochemical customer and his operation shifts so that he no longer needs your service, you're stuck."

"There are plenty of risks involved," says a top executive of a transmission company, "You're dealing with only one customer. If he no longer has a need for your petrochemicals line, then you have an empty pipeline on your hands. Thus, before building such a line, a long-term contract must be agreed on."

The expected sharp rise in the demand for ethylene and propylene—the two petrochemicals most commonly carried by the present short pipelines—may provide the secure sources and markets sought.

Yearly ethylene consumption should climb from 5-billion lb. today to 6.5-billion lb. by 1965, according to Chemical Week, a McGraw-Hill publication. And demand for propylene should grow from 2-billion lb. to a little more than 3-billion lb.

Advances Near in Solids Lines

Look for technological breakthroughs that will permit the movement by pipeline of many products other than those of petroleum.

"The surface has just been scratched as far as solid-material pipeline movement is concerned," says one industry spokesman. "Most industries have always assumed pipelines were made to transport liquids, and have been slow to accept the idea that nonliquids might also be moved inexpensively by pipeline."

This view is shared by Standard Oil Co. (Ind.). "We look for products pipelines to become an increasingly important mode of transportation during the next decade . . . conceivably for the movement of solids in liquid suspension, such as powdered coal, and even iron ore concentrates," says F. Cushing Smith, supply and transportation general manager.

Texas Eastern right now is sounding out several utilities in the New York-Philadelphia area as to whether they would use coal slurry if a line were built to transport it.

TET has been studying the possibility of building such a line from Moundsville, W. Va., to Philadelphia and New York to carry a mixture of powdered coal and water.

The company won't comment on its progress, but it's reported that the 350-mi. line would be 24 in. in diameter, if it's built.

PIPE IS ASSEMBLED at Grand Isle, La., for underwater sulfur line, which is made up of three concentric pipes.

A special pipeline, consisting of three concentric pipes, has been developed by Jones & Laughlin Steel Corp. for the transport of sulfur.

A 7-mi. pipeline of this type is now being completed for Freeport Sulfur Co. from offshore sulfur wells in the Gulf of Mexico to shore, at Grand Isle, La. (PW—Jan.8'60,p35).

The principle of the special pipeline is that sulfur will flow through the innermost pipe, which will be kept heated by water moving through the second pipe. The outer pipe serves as a protective casing for both.

Other nonpetroleum products that pipelinemen are studying with keen interest are wood pulp, grain, and salt.

Thus far, their movement by pipeline is strictly in the talking or planning stages. Petroleum products will continue to dominate the pipeline picture for this decade, at least.

Reprints Available

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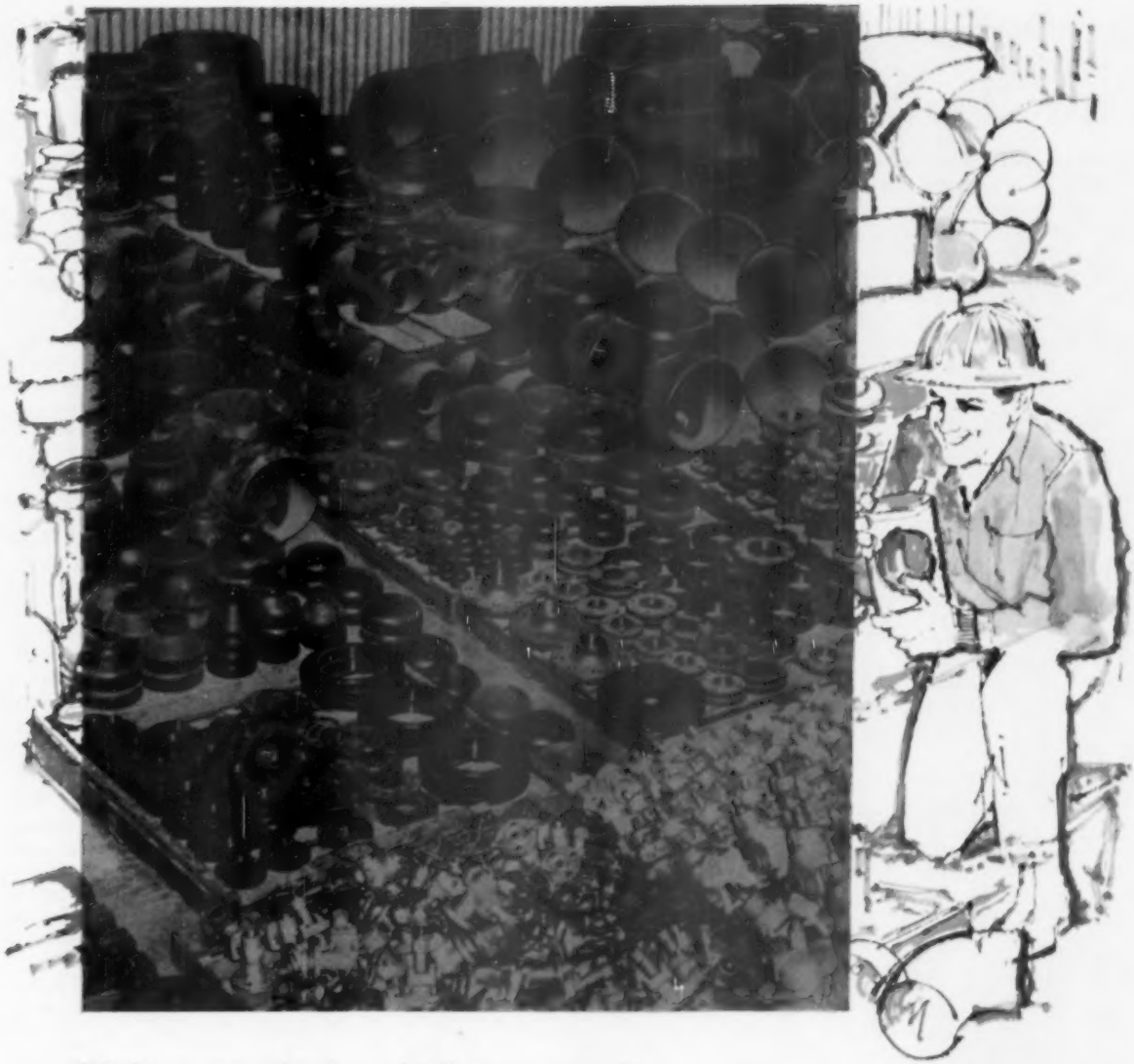

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DEPT/Processing & Petrochemicals

New Polymers Outdate Rubber Plants

Fast progress in the techniques of polymerization and copolymerization is creating many problems for the manufacturers of synthetic rubber.

The petrochemicals industry is constantly coming up with new types of elastomers with promising properties.

This means that rubber manufacturers must be extremely careful when planning new facilities. They feel they have to avoid specialization that would tie them to one type of product. Their reasoning: Such a product may soon be replaced by a newer one, with at least one superior quality, or perhaps one with equal qualities that can be made at lower cost.

For example, Phillips Chemical Co. is expanding its rubber plant at Borger, Tex., for the manufacture of 20,000 tons per year of cis-polybutadiene, the expansion to be completed by mid-1960. But, typically, Phillips has planned the new facilities so that they can be adapted, with minor modifications, to the production of polyisoprene.

Synthetic rubbers of various kinds were first developed commercially during World War II. Of those, the styrene-butadiene (SB-R) rubber became the most popular. Others were based on butadiene and acrylonitrile, or even vinyl chloride.

But a huge quantity of natural rubber—with properties unmatched by the synthetics of that time—was still required; it was used either pure, or mixed in various proportions with the synthetics.

The postwar political unrest in Indonesia and other natural-rubber-producing areas spurred the efforts of scientists who were seeking a synthetic equivalent of natural rubber.

The discovery of orderly, or stereo-regular, polymerization made it possible, in 1954, to produce polyisoprene, a synthetic rubber identical in its chemical composition to natural rubber.

The discovery of this "synthetic natural rubber" gave promise of liberating the world from its dependency on rubber plantations.

Today, however, the production of polyisoprene is still very small.

Shell Chemical Co. has recently added a column to its alkylation plant at its Torrance (Calif.) refinery for the production of isoamylene, which is the raw material for making polyisoprene.

However, it does not appear that production of synthetic natural rubber will be pushed, at least in the U.S., according to rubber scientists Norman Broadway and Stephen Palinchak, of Battelle Memorial Institute. The development of various other types of synthetic rubbers, they say, is lessening the need for large-volume production of synthetic natural rubber.

The reason for the slow progress of synthetic natural rubber is that, shortly after it was put into service, another synthetic stereo-polymer, cis-polybutadiene, was discovered. It displays certain properties markedly superior to those found in either natural rubber or synthetic natural rubber.

Cis-polybutadiene has a very high resilience, and a very low heat build-up. Its resilience is actually greater than that of natural rubber, and its road-wear resistance is also substantially higher. Besides, it can be blended with the SB-R rubbers to impart to them some of the qualities of natural rubber that they lack. It can also be blended with natural rubber to make stocks that can be handled on standard rubber processing machinery.

But the breakthrough of stereo-polymerization does not stop with the simple polymers.

It started a development that is now being carried into the fields of copolymerization and graft polymerization.

The ethylene-propylene "stereo-bloc," for example, is already showing potentiality.

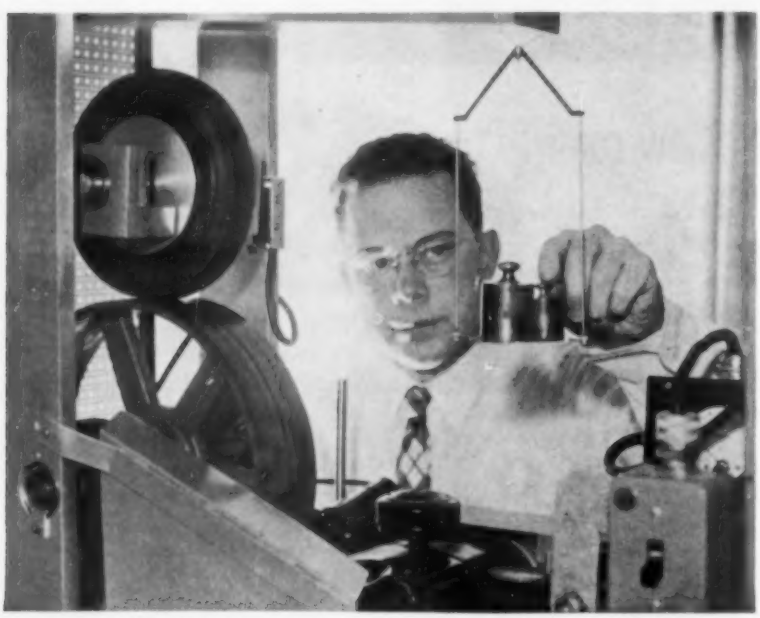
In addition to the development of new polymers and copolymers, the new rubbers are constantly being challenged by other elastomers, such as neoprene, and butyl and nitrile types of rubbers, as well as by the fast development of polyurethane.

Butyl rubber is being promoted for the manufacture of low-noise-level tires, and is making progress (picture).

Neoprene is thriving as a specialty rubber, where oil and ozone resistance and temperature adaptability are essential.

Neoprene in turn is being sharply challenged by the nitrile rubbers in the oil-resistant field.

And polyurethane, with its great strength, high abrasion resistance, and oil resistance, could become a "super-rubber," says George Vila, of U.S. Rubber Co., if a solution is discovered for its relatively poor performance at low temperatures and its excessive sensitivity to moisture.



BUTYL RUBBER miniature tire is being tested on a special machine simulating road conditions, at the laboratory of Esso Research & Engineering Co. Butyl is one of several synthetic rubbers recently developed for its unusual properties.

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For complete information on how you can cut paint maintenance costs while improving your plant's appearance, contact your Du Pont Technical Representative. Or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. PW-63, Wilmington 98, Delaware.

* * *

L. G. Schmeig began his career in Du Pont's Sales Service Laboratory 24 years ago, after completing his education at Temple University. Five years later he became a Du Pont Technical Representative servicing company-owned plants. Since then, he's been busy solving painting problems for architects, engineers and maintenance men in the fields of petroleum, marine, utilities and heavy chemicals. In 1958 he took over as Southwestern District Manager, Industrial Maintenance Sales.

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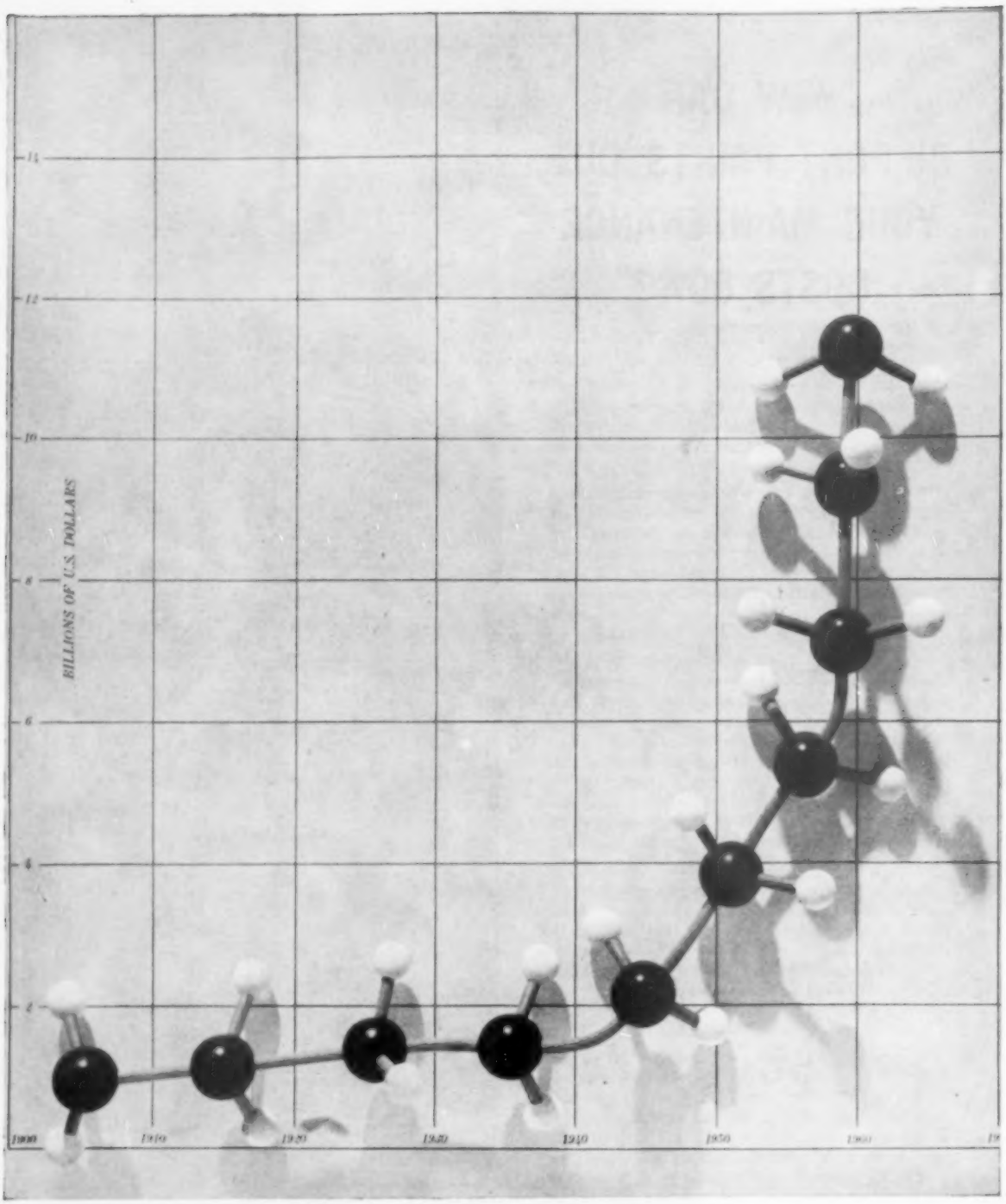

"The upcurve in technology seems to be accelerating. In 1900, industrial research and development was practically non-existent. In 1928, the nation spent less than $100 million for these purposes. Today, expenditures for research and development exceed $10 billion . . . just about double the amount spent only six years ago." —M. J. Rathbone, President

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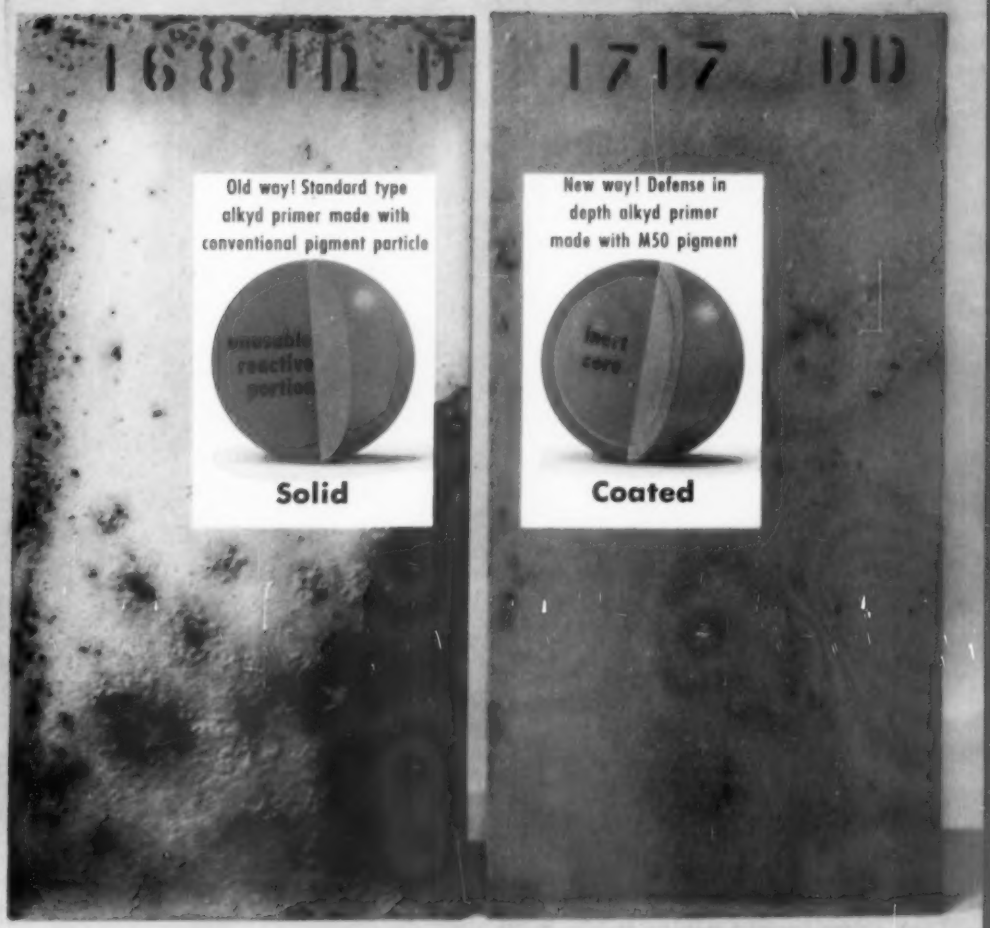
Standard Oil Company (New Jersey)

Never before such durable tank protection


Old way! Standard type alkyd primer made with conventional pigment particle
Solid
New way! Defense in depth alkyd primer made with M50 pigment
Coated

Proof tank paints with M50® pigment form rust-inhibitive films of outstanding strength and durability

Test panels like these *prove* what paints can do. And these two make it plain that paints containing *M50* basic lead silico chromate—a new National Lead rust-inhibitive pigment . . . form outstandingly strong and durable protective films.

Excepting the pigment, both primers shown on the test panels contain the same ingredients. Both are applied (2.0 mils, dry) on rusted and mill-scaled steel (to increase test's severity). Both have been exposed 12 months in industrial atmosphere (Perth Amboy, N. J.) and 12 months in normal atmosphere (Sayville, L. I.) at 45° South. You can see the effect.

A striking difference! Yet film strengthening proves to be only one of many improvements that *M50* pigment makes in metal protective paints for steel tanks and structures. Now—with new *M50* pigment—your regular paint suppliers can provide metal protective paints with outstanding advantages:

- Weather-resistant anti-corrosive primers.
- Intermediate and finish paints *with* exceptional rust inhibition but *without* bilging hazard in sulfur-laden atmospheres.
- Finish paints in a wide range of decorative colors that don't fade or wash out.
- Alkyd-type conventional and deep-coat paints with outstanding durability, package stability and sprayability.

What makes the difference? Basically the differences that make a difference in *M50* pigmented paints are inherent in the unique *M50* coated pigment particle itself (idealized particle shown above.) See, on the next page, the extra protections the *M50* particle provides in the dried film. See, too, how you can get the benefits of these new, much more durable, anti-corrosive paints.

M50 an **oncor** *pigment development of*

National Lead Company

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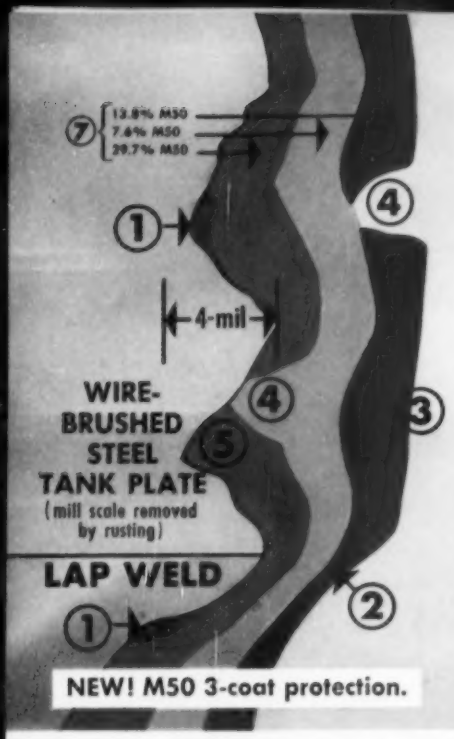
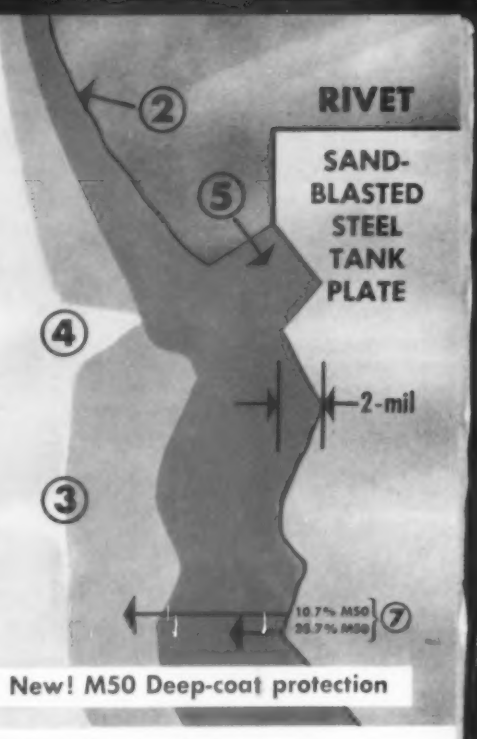


NEW! M50 3-coat protection.

1. **Pockets of rust prove less harmful** on steel surfaces painted with conventional *M50* paints. Vehicles penetrate and isolate existing rust. *M50* particles stop rusting action.
2. **Where paint film lies thin** over tiny surface projections and sharp structural edges, the *rust-inhibitive* pigment content in all coats of *M50* paints provides extra protection.
3. **Just-right flow characteristics of** package-stable *M50* paints aid leveling on rough steel surfaces, promote smoothness, good appearance.
4. **Inevitable "holidays" in film** do not destroy protection. Again, *all M50* coats have both rust inhibition *and* weather resistance.
5. **M50 paints "wet" well,** penetrate pits and crevices, carry *M50* protection to every part of these danger spots.
6. **Lightweight M50 particle** aids formulation of new type deep-coat paints with *uniform* rust inhibition throughout the film and low sag characteristics.
7. **Every coat can have rust inhibition**—not just the primer. Note percentages of *M50* in dry films. What's more, for equal weights of corrosion-inhibitive pigment, *M50* primers contain 40-60% more corrosion inhibition by volume than non-*M50* primers.



New! M50 Deep-coat protection

Sections through **M50** Defense in Depth films show dramatic extra protection these new tank paints provide

Information on the preceding page proves that *M50* pigment paints form stronger protective films than anti-corrosive paints made with other rust-inhibiting pigments. The sections above show some of the ways in which these new paints perform better in the dry film. Below you will see *proof* that *M50* metal protective paints don't bilge, are unique for color stability and the color range in which they can be made.

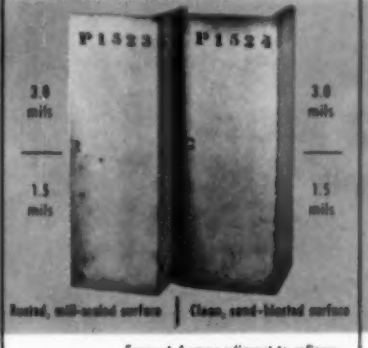
Hold the *M50* pigment particle itself responsible for all these improvements . . . *Basic lead chromate* is known for exceptional rust-inhibiting action. In the *M50* particle, this reactive business portion of the particle is coated on an inert core . . . where *all of it is available* to react. The coating is *fused* on—shows superior resistance to chalking, erosion, chemical action. Unusual tintability is due to the geometric configuration of the coated silica particle.

Why M50 Defense in Depth paints give anti-corrosion beyond all former concepts

Gray Alkyd Finish Coat
2 standard pigment alkyd primer coats
1 standard pigment alkyd primer coat
2 M-50 pigment alkyd primer coats
1 M-50 pigment alkyd primer coat

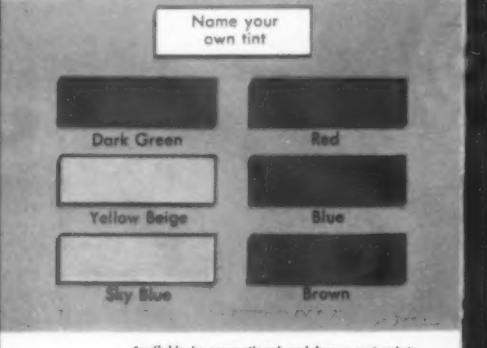
Exposed 9 years, 45°S. Each coat 1.5 mils

Proved corrosion and weather resistance



Exposed 4 years adjacent to refinery

Proved anti-bilging performance



Available in conventional and heavy-coat paints

Proved stability in wide range of colors

Are you concerned with tank or structure maintenance painting in your firm? If so, you are invited: (1) to visit National Lead's Sayville, L.I. test station, where you will see the results of the 20 years research that lies behind the *M50* pigment particle and the more than 10 years of exposure testing that lies behind *M50* pigment Defense in Depth paints; (2) to send coupon below for National Lead booklet, "Defense in Depth" and typical *M50* tank paint specifications.

Next time you purchase, specify *M50* pigment paints. Any paint manufacturer can supply you.

M50 Defense in Depth

National Lead Company,
111 Broadway, New York 6, N. Y.

Gentlemen: Please send me the "Defense in Depth" booklet together with typical tank paint formulas and color chips that I can use in specifying M50-type tank paints.

Name_____ Title_____

Firm or Dept._____

Address_____

City_____ State_____

On-Stream Titrator for Sulfur Control

Control of sweetening operations in refineries can be substantially simplified by the use of a new, automatic, "on-the-spot" titrator for mercaptan sulfur compounds in petroleum products, according to Standard Oil Co. (Ind.), which developed it, and has tested it on several processing units.

Most liquid hydrocarbons, such as gasoline, naphthas, light gas oils, and similar distillates contain sulfur compounds, mostly in the form of hydrogen sulphide, elementary sulfur, or mercaptans. These must be removed at some point during the refining operation.

Some must be removed in the early stages of refining, otherwise the next processing operation (for example, catalytic reforming) would be spoiled. Others may be removed just before the final blending, storage, or shipment of the finished product, to improve its odor, its color stability, or its susceptibility to tetraethyl lead. Frequent checkup analyses of the process are necessary to keep it at top efficiency.

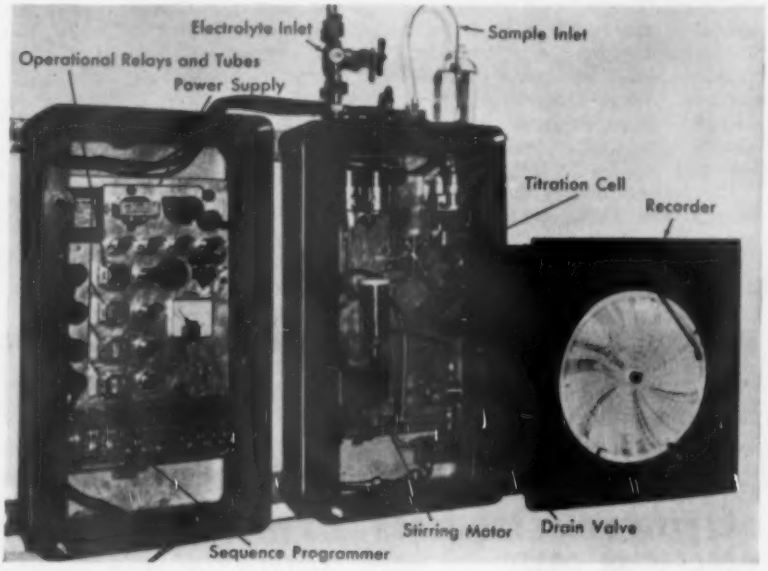
Indiana Standard's automatic analyzer determines quantitatively the mercaptans in the stream on which it is installed, through their reaction with silver ions produced on the spot. The time it takes to complete the reaction is proportional to the mercaptan content of the sample.

In the Soind titrator, the silver reagent is generated electrolytically, by what is referred to as "coulometric" generation. The two electrodes are silver, and the electrolyte consists of 10cc. each of ethanol, acetone, and benzene, with 0.5 cc. of a saturated sodium nitrate solution.

A constant-intensity direct current is passed through the electrodes to generate silver by oxidizing the anode. When a reference quantity of silver has been produced, a 1-cc. sample of the hydrocarbon stream is automatically admitted into the titration cell, and the content of the cell is magnetically stirred (picture, above).

The silver and the mercaptan sulfur react to form a silver mercaptide. When the reaction is completed, the excess silver ions in the solution increase the flow of current between a second set of silver electrodes, this activates a relay that stops the titration. The time necessary for the titration is recorded; it is proportional to the mercaptan content of the sample.

The titrator is then automatically drained, a 40-second operation, and it is ready for the next titration.



Up to twenty samples per hour can be automatically taken from a refinery stream and analyzed, the company says.

A small side-stream from the process line flows continuously through a bypass line. In that line is installed the rotary sample-metering device. Admission of a 1-cc. sample into the titration cell is accomplished with the help of low-pressure nitrogen.

On six different sorts of distillates, good agreement between the automatic titrator and conventional laboratory titration has been observed, according to Standard.

Agreement of closer than 3% is repeatedly obtained, the company says, over a range from 3 to 30 mercaptan numbers.

The conventional laboratory analysis—such as UOP method 163-59—is accomplished by a potentiometric titration in an alcoholic solution of sodium acetate, using alcoholic silver nitrate as titrant.

Analog Device Fights Pulsations

An electrical-acoustical device has been developed to simulate all conditions of a gas-compressor-and-piping system. Its purpose: to study and resolve the difficult gas pulsation problem.

Reciprocating-type compressors deliver gas to piping systems in the form of pulsations. The factors that contribute mostly to these pulsations are:

- Compressor speed and clearances,
- Crank angle arrangement,
- Gas temperature,
- Individual piping components.

The component parts of a piping design give it a certain acoustic resonance. When that resonance corresponds to the frequency of the pulsations emitted by the compressors, excessive vibrations are produced.

A length of pipe will respond to a certain frequency in much the same way as an organ pipe is tuned to a particular frequency.

The vibrations can be hazardous and very costly. Anchor devices must be periodically replaced when the vibrations are extremely severe. Piping failures resulting from metal fatigue may also occur.

The secret is to design the piping system so as to avoid acoustic resonance in harmony with the pulsations generated by the compressors.

The new device, called an electro-acoustical analog, makes it possible to calculate and design a piping system to suit a certain compressor performance.

This analog device is not an analog computer: It is simply a device that simulates electronically the actions of a compressor and its suction and discharge piping.

It was developed through the cooperation of the Southern Gas Assn.,

and the Southwest Research Institute.

Physically, a one-foot section of pipe is represented by a coil and two capacitors; likewise, each mechanical portion of the system is represented by electrical components. And electrical quantities are made to correspond to system characteristics. For example, voltage, amperage, and wave velocity correspond to pressure, mass-flow, and sound-wave velocity.

The performance of the system is observed on a cathode-ray oscilloscope.

The electro-acoustic analog is currently being used by Permian Basin Pipeline Co.

Richard E. Mayne, of Permian Basin, described the device at the recent meeting of the Natural Gas Assn. of America, in Odessa, Tex. He said his company and its parent, Northern Natural Gas Co., use the device to design new systems as well as to correct existing installations. It has been used, up to now, on 28 individual designs, including 93 compressors. Up to three compressors can be included in one system.

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Precision Scientific Development Co.

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Gas Turbine for Standby Power

Aviation-type gas turbines, using diesel fuel, are now being installed in England to carry peak loads in power generating plants.

This new development was described this month at the Gas Turbine Power division meeting of the American Society of Mechanical Engineers, in Houston, by B. G. Markham, engineer of Bristol Siddeley Engines, Ltd., Bristol, England.

In the average United Kingdom public utility generating plant, Markham said, 29% of the installed capacity is used less than 1,000 hours per year.

In processing plants and factories, a similar condition prevails: In Markham's own factory, last year, the gas turbine installed to take care of peak loads ran only 66 hours.

The principal reason for selecting this type of engine for peak-load standby is the low capital investment involved.

Markham pointed out that the cost of installing such a turbine is about one-third that of a conventional turbine built specifically for stationary use.

It is also less expensive than a Diesel installation.

But there are several other incentives in favor of the aviation-type turbine.

These include very low standby cost; automatic, entirely unattended operation; rapid, absolutely certain starting; and reliability.

The distillate needed for such a turbine costs substantially more than the low-grade fuel satisfactory for a stationary-type turbine. But that's no deterrent, because of the short operating periods.

Fuel cost is only 10% of the unit's total annual cost. Reliability and certain starting easily make up for the higher fuel cost.

The turbine is started by dialing a code number through the telephone system. From then on, the starting cycle is automatic.

Safety features similar to those on an oil-burner installation are provided.

A recycling device allows combustors to be scavenged and initiates a new cycle if ignition is delayed.

Only difficulty experienced: air compressor fouling due to fog. For this reason, the compressor is regularly washed with a mixture of water, kerosene, and antifreeze.

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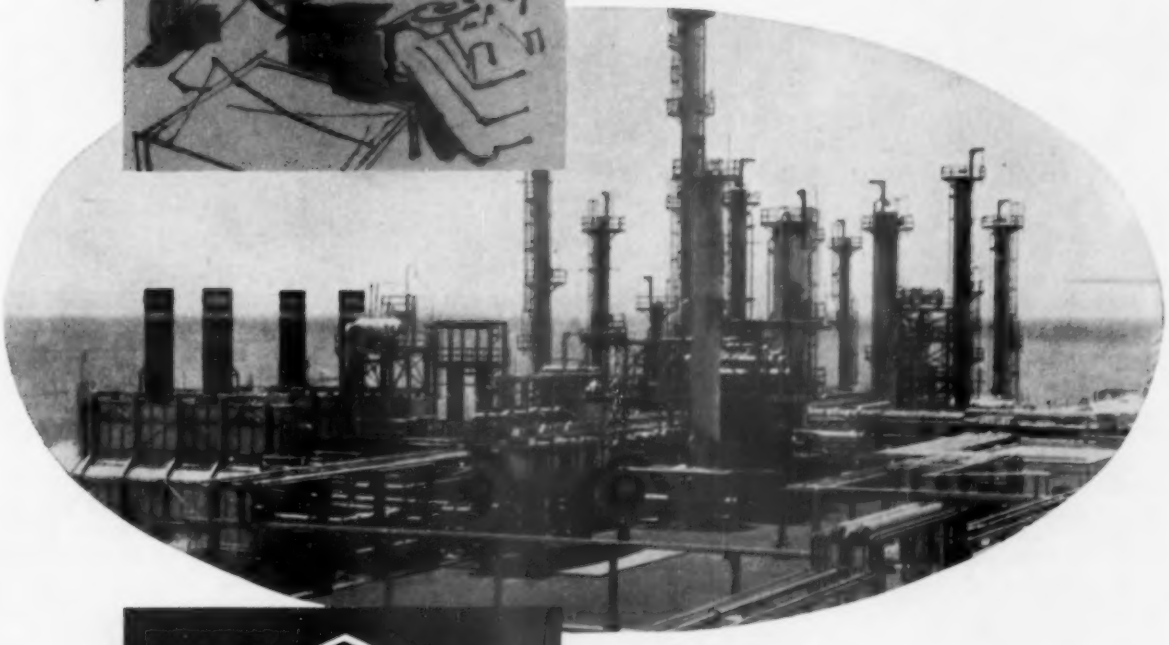
*A SUBSTANTIAL INCREASE IN PROCESS CAPACITY will be needed by 1962, according to reliable estimates . . . NOW is the time to start your planning!



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IF TIRES COULD TALK THEY WOULD TELL YOU:

"Very close to 50 percent of the butadiene required for synthetic rubber in the U.S. can be produced by plants using the versatile one-step Houdry Dehydrogenation Process.

"And most of this capacity has gone on stream since 1957, based on a background of serving U.S. industry for over 15 years. It is also producing butadiene in Europe, and two additional units will go on stream in Europe and Asia this year."

By direct dehydrogenation of butane, the Houdry Dehydrogenation Process can produce butene as well as butadiene, and produces other mono- and diolefins from the corresponding saturated hydrocarbons. This flexibility allows processors to switch their output to meet changing market conditions, and the changing demands of the chemical industry. Adapting the process to yield a changed end product is simple and economical.

A description of the Houdry Dehydrogenation Process and the economics of its operation will be sent promptly, on request. When you write, you'll find it well worth your while to ask for an up-to-date outline of Houdry services, too.

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*Houdry means Progress...through Catalysis

What's New / IN PROCESSING

A big buildup in petrochemical capacity is slated for Russia's East European satellites, according to news sources in Berlin.

The proposed Russia-East Europe pipeline will bring crude to three new plants: (1) a 16-million-bbl.-a-year unit at Ploc, Poland, which will produce fuels, phenol, acetone, ethylene and propylene, and solvents; (2) Leuna Werke's Schwedt-on-Oder plant in East Germany, where a capacity of 32-million bbl. per year is expected by 1965; and (3) Slovnaft-Works' unit in Bratislava, Czechoslovakia, which will produce a full line of oil and petrochemical products, including plastics and synthetic fibers.

•

Northwest Petro-Chemical Co. will extract chemicals from spent caustic when its $600,000 plant at Anacortes, Wash., now under construction goes on stream Apr. 1.

Caustic liquor will come by pipeline and truck from nearby refineries in Washington and British Columbia. Most of the phenol, acrylic acid, and xylenol extracted will be used in local plywood manufacture. Some will be exported to Japan.

•

Austria's first petrochemical plant —Danubia Petrochemie A.G.—is set to go on stream at Schwechat, 5 mi. east of Vienna, before the end of the year.

The plant, to have an initial capacity of 5,000 long tons of "Daplin" polypropylene a year, will process refinery gases from the Austrian state refinery now under construction nearby.

Until the refinery is finished, Danubia will polymerize propylene imported from Italy's Montecatini S.A., one of its parent companies. The other parent is Austrian Nitrogen Works A.G.

•

A new company—Witfield Chemical Corp.—has been formed to build and operate a $1.7-million petrochemical plant at Los Angeles.

The new firm is a jointly owned venture of Richfield Oil Corp. (L.A.) and Witco Chemical Co., New York. Richfield will supply the new outfit with benzene and propylene tetramer for the production of dodecylbenzene, a basic raw material used in the manufacture of detergents.

•

Phillips Chemical Co. will double ethylene capacity at its Sweeny (Tex.) plant when a second ethylene unit goes on stream next year. By next month, ethylene production at the existing unit is expected to hit 290-million lb. a year.

•

A $1.6-million face-lifting job will start Apr. 1 at DX Sunray's Duncan (Okla.) refinery. The project involves modernization of the gas recovery unit and complete turnaround of the cat cracking unit. In addition, a new steam generator will be installed. Procon, Inc., is doing the work; completion is set for May 15.

THE COST CUTTING SERIES . . .

LUBRICATED VALVES Speed Product Transfer

These Rockwell-Nordstrom lubricated plug valves (above) have reduced loading time at a major petroleum products terminal by increasing the speed of product transfer. Since these valves are fully opened and fully closed with an easy 90° turn of the lubricated plug, the result is smooth, fast, virtually foolproof flow control. Product leakage problems are eliminated, too, by the leakproof pressurized lubricant seals between the plug and the body. Cost records show that lubrication has practically eliminated valve wear. It insures longer life at lower cost. For complete information on the world's most complete line of lubricated plug valves, write:

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French Tie In to Greek Oil Hunt

PARIS—French government-controlled oil exploration companies are continuing a recent move abroad, outside French territory. The latest: Greece.

Until now, virtually the only such French exploration or producing interests were those of Cie. Francaise des Petroles, an integrated international company with a substantial stake in the Middle East. The new moves are noteworthy because they are being made by companies that do not have refining or marketing outlets.

The move to Greece is being made by Regie Autonome des Petroles. Last week it was concluding negotiations for a 50% interest in a joint venture in eastern Thrace with Ilios, a private Greek company that has been exploring there for several years. RAP is to be the operator and will invest a minimum of $950,000 in a four-year exploration period.

The new drive—still of modest proportions—was spearheaded late last year by a move to Sicily.

The company operating there is Petropar, which acquired a 50% interest in a joint venture with a private Italian company (PW—Oct.23'59,p 47).

The French expect to be successful in their recent bid to explore in mainland Spain in a joint venture with the Spanish government's INI.

This deal involves a group of French companies, two government-controlled (RAP and Soc. Nationale des Petroles D'Aquitaine), and two private (Petrorep and Repga).

If the deal goes through, the French group and INI will explore acreage around Bilbao in the Ebro River Valley.

The French have been turned down by Spain on another bid for exploration interests in the Spanish Sahara.

The reason, according to Paris sources: The French were not willing to put up more than 50% of the exploration investment for a joint venture with the Spanish INI.

The bid was made by a French company—S. A. Estudios y Exploraciones Petroliferas—set up for the purpose by two French oil-finance outfits and the government-controlled Safrep.

The company had offered INI a 50% interest in a French Sahara permit in exchange for a 50% interest in eight Spanish Sahara blocks.

The Spanish argued that they would be unable to bear as much as 50% of the exploration cost, especially since most of it would be in foreign exchange. French sources say that Spain preferred to grant the acreage to companies that offered to cover 75% of costs, giving the Spanish partner a 50% interest in any reserves discovered.

Europe's Coal Demands Oil Curb

PARIS—As in the U.S., coal producers in Europe are now demanding a unified "energy policy" that would give coal a better chance against oil.

The bid was issued last week by a committee of French, German, Belgian, and Dutch coal producers in a report called "A Coordinated Energy Policy."

In it, they press for application of the same rules to coal, oil, and natural gas to insure competition in the six Common Market countries of Europe.

The European group also proposes specific measures to improve the competitiveness of coal versus oil. These include:

- A customs duty or consumption tax on imported crude and products in the six-nation group.
- Heavier taxes on residuals and lighter taxes on gasoline, by revision of government tax policies.
- Quotas for imports of crude and products.

Coal producers also advocate a common import policy, coordination of taxes on different types of energy within each country, and fair transport charges for each fuel.

The main aim of the proposed energy policy, according to the report, is to eliminate present "distortions" in the competitive position of European coal, compared with imported coal, oil, and gas.

One measure they consider necessary: Application of European Coal & Steel Community regulations to oil and natural gas, as well as coal. These require publication and observance of prices, and authorizations for company agreements or mergers.

New sources of energy—such as Sahara gas and nuclear power—should be introduced only gradually, they suggest, to prevent upsetting the European market.

And for long-term planning, they recommend that Common Market countries keep close check on energy production and try to steer direct investment into the sectors where it is most needed.

Italy Set to Build Platforms

MILAN—Italy's first venture into building of mobile offshore drilling platforms is now set under an agreement between R. G. LeTourneau, Inc., Longview, Tex., and Nuovo Pignone, manufacturing affiliate of Italy's state-owned ENI group (PW—Jan.29'60,p36).

Nuovo Pignone is authorized initially to build one self-elevating LeTourneau platform, director Vittorio Scherillo told PETROLEUM WEEK. It will be an isosceles triangular unit 185x152 ft., with 178-ft. legs, capable of operating in water 100 ft. deep.

R. G. LeTourneau will provide designs for the entire unit and will build some parts, including the elevating system, legs, and mechanical and power driving unit.

Nuovo Pignone will build the platform at its Massa plant under LeTourneau supervision. It will also equip it with an Ideco-Pignone E2500 rig.

The initial unit, to be completed this year, will be assigned to the Italian Saipem, another ENI affiliate, with destination and use still to be decided. Saipem is currently using a similar LeTourneau unit in Sicily, which it bought in the U.S., originally intending it for ENI's operations in the Persian Gulf.

The Italian manufacturer has an option to build further LeTourneau platforms, providing the first job is successful. Scherillo expresses confidence that the venture will develop into commercial-scale building of the units.

Pan Am Slates New Persian Gulf Test

Pan American International is getting set to spud its second Persian Gulf wildcat in April, when it will test another corner of its big offshore Iranian tract.

Pan American's first test on the 6,177 sq. mi. block held jointly with National Iranian Oil Co. is in the northwest corner, 58 mi. from the Iranian shore. It is currently being drilled ahead from a mobile DeLong platform after encountering slight oil and gas shows—as yet unevaluated—at 11,300 ft. (PW—Feb.26'60,p10).

A second rig will be put into operation to drill the new test to 13,000-14,000 ft. in the southeast corner of the block, about 25 mi. from Bushire on Iran's coast.

The specific location, in water 142 ft. deep: Latitude 28°55'6" north; longitude 50°27'48" east. This is roughly 60 mi. east and south of the current wildcat.

Seacat Marine Drilling Co. is the contractor for IPAC, the operating company owned jointly by Pan American and NIOC.

Unlike the first wildcat, the second will be drilled from a fixed platform, using Panintoil No. 1, Pan American's specially built tender (photo).

SPECIAL TENDER will be used on Pan American's second Persian Gulf test.

The 272-ft. self-propelled vessel has complete air-conditioned living quarters for all operating personnel. A distinctive feature, Pan American says, is a 60-ton revolving crane, mounted forward on the main deck, which increases the flexibility of platform-tender drilling. Operations will be supplied by three service vessels and two helicopters from IPAC's operating base at Khosrowabad, 142 mi. from the new site.

Swiss To Act on ENI Pipeline Plan

GENEVA—The question of which proposed pipeline may eventually carry crude oil into southeast Germany from the Mediterranean may be settled soon by Swiss legislation being drafted (PW—Aug.28'59,p40).

Its primary purpose is to clear the way for construction of a major line that would run from Genoa to Aigle, in Switzerland.

The line, together with a refinery to be built at Aigle, is projected jointly by Italy's state-owned ENI and an Italian-Swiss investment concern in Geneva.

The legislation could clear—or kill—the plan of Italy's ENI to extend the projected Genoa-Aigle pipeline into Bavaria.

This is the most concrete of several proposals to pipe crude into that southeast German province from various Mediterranean ports, including Venice and possibly Marseilles. ENI has already set up a German company jointly with a group of Bavarian banks to extend the Aigle line.

Local governments of all Swiss cantons directly concerned with the ENI project have had a voice in drafting the pipeline legislation, which is being readied for consideration by the federal cabinet. This will take the form of a constitutional amendment, which will require ratification by nation-wide vote.

Swiss railroads also were represented in a recent Bern discussion session called by the Ministers of Public Economy and Communications.

The Swiss have been assured that ENI intends to go through with the pipeline to Aigle—and the refinery there—even if the line cannot be extended to Germany.

The initial stage of the project is strongly backed by the two cantons directly concerned (Valais and Vaud), which see in it a big boost to their economies. It thus appears firm, despite opposition from Swiss railroads and Rhine River barge companies, which fear competition in transport of Switzerland's oil imports.

Outlook for the second stage is cloudier. Two cantons (Bern and Aargau) through which the Aigle line would run to Germany show no great enthusiasm for the extension plan, mainly because of legal problems in providing a right of way.

Japanese Aim High On Arabian Output

NEUTRAL ZONE—By 1964, the Japanese-owned Arabian Oil Co. hopes to be producing 100,000 b/d of crude from over 40 wells on its Neutral Zone offshore concession, company president Taro Yamashita told a London press conference last week. This, he said, would make Japan self-sufficient for one fourth of its total oil demand. The company recently completed its initial discovery.

What's New / AROUND THE WORLD

FRANCE—Development of Parentis—still the biggest oil field in mainland France—is now completed, Esso Rep reports. Out of 37 tests drilled since its discovery in southwest France in 1954, 30 are oil producers and four are being used for water injection. The field's output was increased slightly last year to about 22,500 b/d.

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PHILIPPINES—Shell expects to make excess fuel oil available for export from its projected 25,000 b/d refinery. The $22-million plant, it announced, will be built within two years at Tabangao, about 70 mi. south of Manila.

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GERMANY—West Germany's crude imports jumped 55% last year to about 334,000 b/d, while product imports declined to 102,000 b/d, according to the German oil industry association.

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MEXICO—Mexico's refining capacity is slated for a substantial boost, with new units planned by Pemex in three different areas: (1) Mexico's first Pacific coast plant —details to be announced shortly; (2) doubling of the 40,000 b/d plant at Salamanca; (3) a new plant in the Isthmus area at Minatitlan (where there is already a 72,000 b/d refinery) with initial 50,000 b/d capacity, to be boosted to 130,000 b/d by the end of 1961.

•

USSR—Soviet exports of crude and products jumped 40% last year to 25-million metric tons, according to official figures released last week.

This is equal to 20% of 1959 crude output, which increased 14% over 1958, to 129.3-million metric tons. In 1958, oil exports totaled 18,130,000 tons, a 32% rise from 1957.

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WEST GERMANY—Heating oil is now set for a new 3-year tax in April that will give the government $235-million to help subsidize coal.

Parliament last week passed a long-debated bill that provides for a $7.14 per ton levy on heavy heating oil and $2.40 on light, authorizing the government to increase both by 150% if necessary.

•

SPAIN—Awards of oil rights to two U.S. groups in the Spanish Sahara and another in Spain were officially published in last week's state gazette, following earlier approval (PW—Jan.22'60,p62).

Sahara blocks 1, 2, and 8: Union Oil Co. of California with Petrolifera Iberica (private Spanish firm).

Sahara blocks 15 and 23: Sun, Pure Oil, and Champlin Oil & Refining, also with Iberica.

Seven mainland Spain permits: Gulf Oil with Ciepsa (private Spanish firm). This follows earlier publication of 13 mainland permits for Phillips Petroleum.

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LIBYA—British Petroleum Co. is about to start marine seismic surveys of offshore portions of two of its tracts —block 34 at Tripoli, and block 36 in eastern Libya. BP currently has seven seismic parties working on its eight tracts. It is also drilling two deep tests, one below 700 ft. on block 35, the other below 10,500 ft. on block 37.

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SAUDI ARABIA—Oil output was pushed up to a second successive record in February: 1,245,800 b/d, topping January by 24,623 b/d. Output in February, 1959 was 1,112,044 b/d.

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MEXICO—Pemex announces it will spend $40-million at Poza Rica to expand drilling and transport facilities in Mexico's oldest producing area. Net proven reserves are 1.7-billion bbl., Pemex says.

•

ARGENTINA—Argentina officially started oil flowing through its first major pipeline outlet for shut-in northern production last week, with a second, for gas, due to open in a few weeks (PW—Oct.16'59,p56).

The twin lines, each over 1,000 mi. long, tap the Campo Duran and Madrejones fields in Salta province near Bolivia. Some three dozen wells have been completed there so far, with combined producing potential of 45,400 b/d of crude and 353-million cu. ft. of gas daily.

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GUATEMALA—A group headed by Phillips Petroleum wants to build a 12,000 b/d refinery, Guatemala's second, near Matias de Galvez port. Permission to build the $18-million plant was requested by a newly-formed company called Refineria Petroleos de Guatemala S.A. Breaux Bridge Refining Co. and Shell are currently building a 3,500 b/d plant at the same port.

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Arab Group O.K.'s Two Oil Proposals

CAIRO—The Arab League's Economic Council approved two Arab oil proposals at its annual meeting last week, following recommendation by its petroleum subcommittee:

- Formation of a $386.6-million Arab company to build a new Persian Gulf-Mediterranean pipeline.
- Unification of Arab oil policies.

The proposals must also pass the league's top body before they are recommended to its nine individual member states.

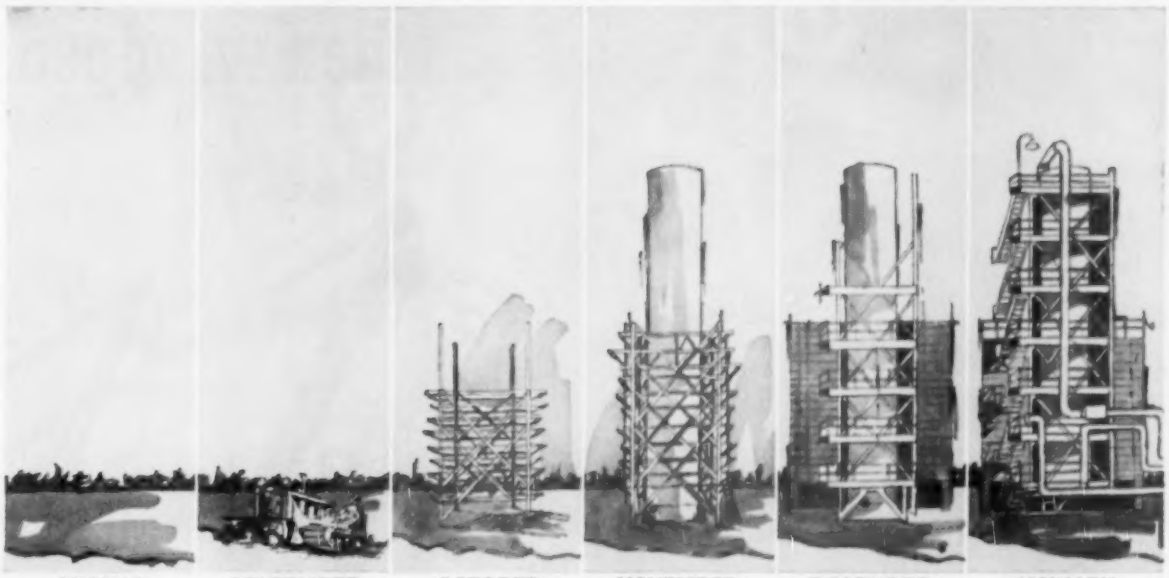
Wildcats In the News

FRANCE—A new gas find has been made in southwest France by a wildcat 7 mi. west-northwest of the St. Marcet gas field. The No. 1 Charlas flowed over 14-million cu. ft. daily in latest tests from 7,021 ft. Regie Autonome des Petroles considers this indicates a production potential equivalent to its best St. Marcet wells.

SWITZERLAND—A new Swiss oil company will spud its first wildcat in May in Zurich canton at Limburg. The company, SEAG, holds concessions from four cantons and plans further tests in Zurich and Aargau.

IRAN—The Consortium is planning a new inland wildcat, at Pazanun, where site preparation is now under way between the Agha Jari and Gach Saran field. It is currently drilling two wildcats on the coast, at Binak and Kuh-I-Mund, and is preparing to spud a third at Suru. This will be the first at the eastern end of its operating area.

CHEMICO BUILDS NITRIC ACID PLANT IN SIX MONTHS



It took just six months for Chemico to successfully complete a 120 ton per day nitric acid plant in Lawrence, Kansas. Until the client gave his final "go-ahead," not an hour of drafting or engineering had been done on the project—not a single piece of equipment had been placed on order. Yet, six months from that date, the plant finished its acceptance test run, producing at above rated capacity.

With 34 nitric acid plants in operation all over the world, and three more in the design stages at this very time, Chemico maintains its position of leadership in this field. In building plants to produce Ammonia, Urea, Nitric Acid, Acetylene, Methanol, Hydrogen, Sulfuric Acid and other chemical and petrochemical products, Chemico is setting new standards for the entire engineering industry.

This six month performance for a nitric acid plant follows closely the recent successful completion of an ammonia plant in ten months. It is not just the time factor alone which sets Chemico plants apart, however. Chemico clients know that they are buying efficient, economical, proven processes which assure ease of start-up and simple, safe operation. If you are considering building a new plant or enlarging present process facilities, let Chemico help you get the most for the capital you invest. Write for the General Bulletin which describes the wide range of Chemico's activities.

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"They engineered this oil line to a cat's whisker then wrapped it

One of the world's largest pipeline operators chooses the world's toughest tape coating for new Patagonian oil line

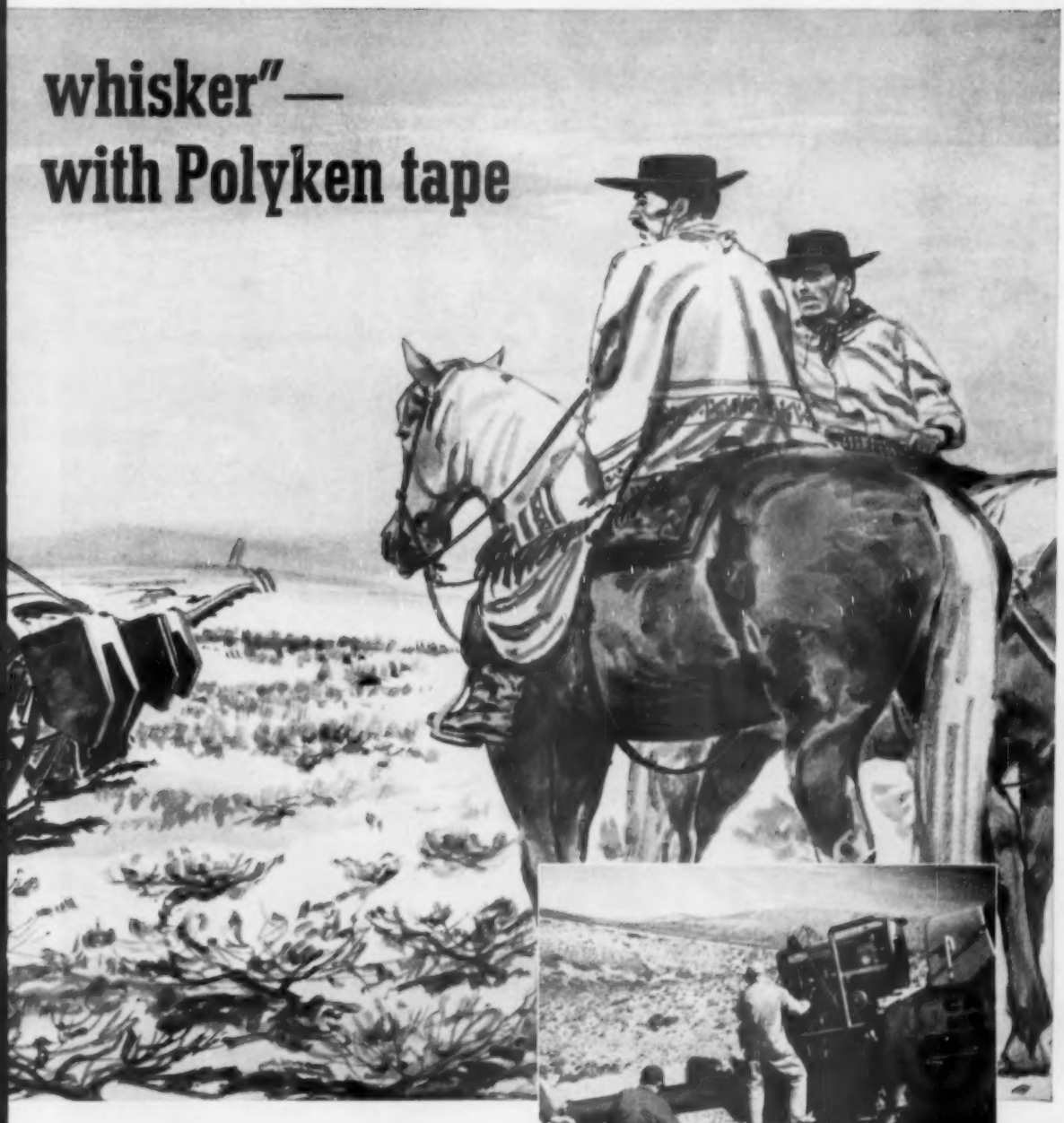
A leading international pipeline company recently wrapped over 100 miles of crude oil gathering and transmission line with Polyken No. 960 Extra-Strength Pipeline Roll. The pipe ranges from 2 to 14 inches in diameter.

An Example of Perfection

The new line, which crosses part of the Patagonian plateau of southern Argentina, is an example of perfection in pipeline design. "They engineered it to a cat's whisker," is the way a seasoned pipeliner put it.

In their construction plans, the engineers specifically called for Polyken No. 960 Tape as the protective coating. Seven years of private testing and study had convinced these people that Polyken

whisker"—
with Polyken tape



Using tensioned-spindle equipment, pipe is cleaned and wrapped in one factory-smooth operation. Polyken tape is always ready. No primer, no drying or cooling. No fumes or fire hazard.

delivers the durable, practical protection that a precision-built line needs. Quite a few other major oil and gas companies have come to share this conviction in recent years.

The Man to See

There's a lot to be said for Polyken tape. There's the frequent, substantial saving, the ease of application, the speed and performance, and more. See your Polyken representative or call the Polyken tape coating distributor near you. Or simply write Polyken, 309 West Jackson Blvd., Chicago 6, Ill.

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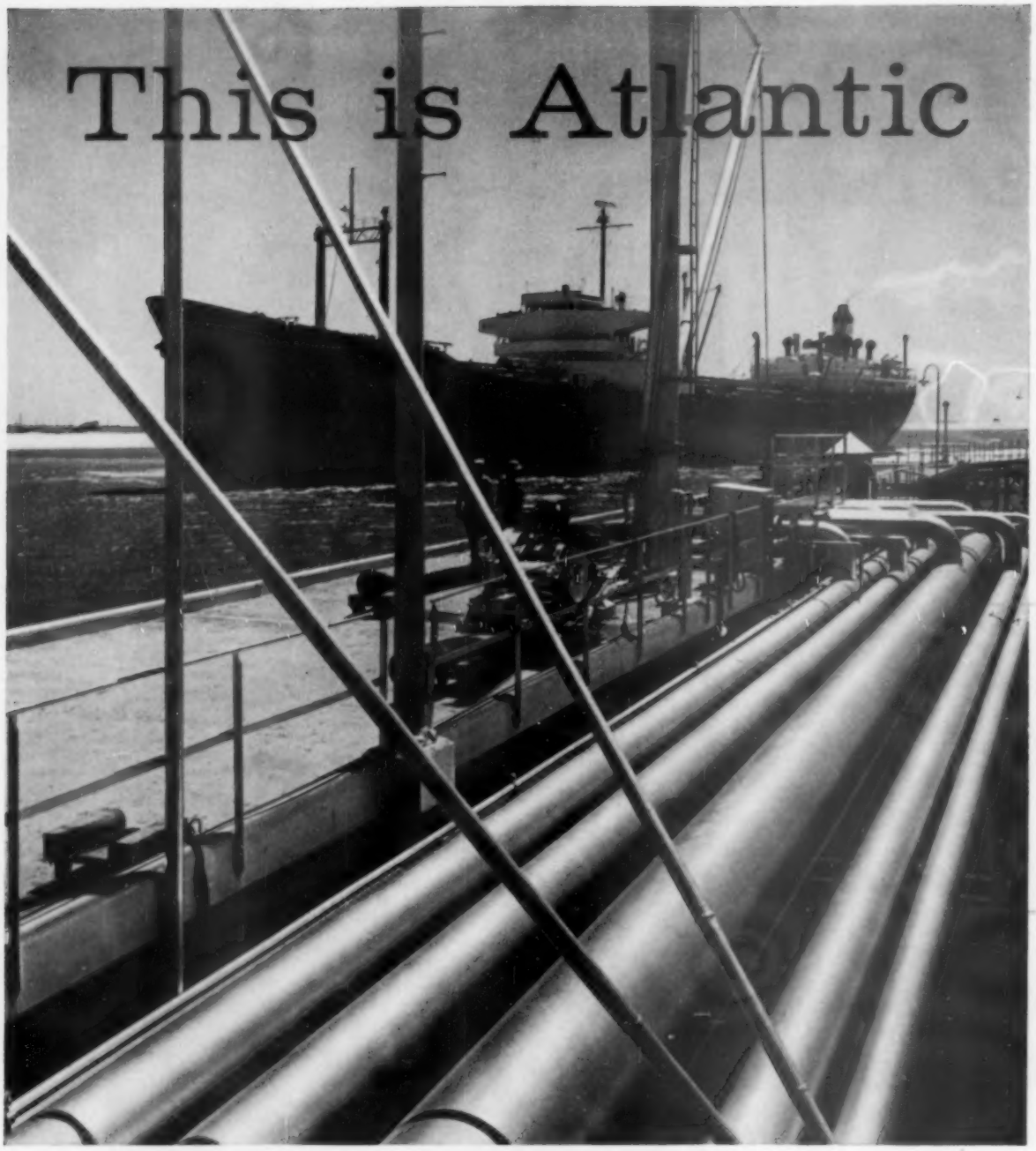

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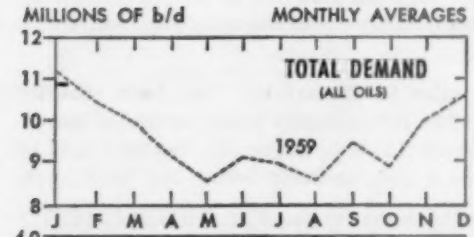
PETROLEUM WEEK'S

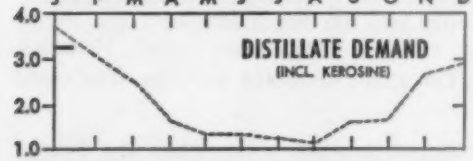
Fingertip Figures



Figures for period ended March 11, except as noted

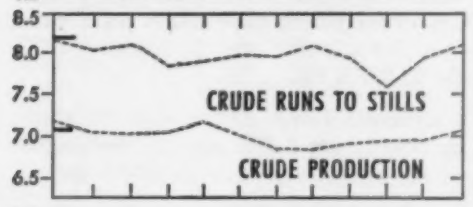
TOTAL DEMAND

Latest 4-week average	10.744
Year ago	10.184



DISTILLATE DEMAND

Latest 4-week average	3.225
Year ago	2.917

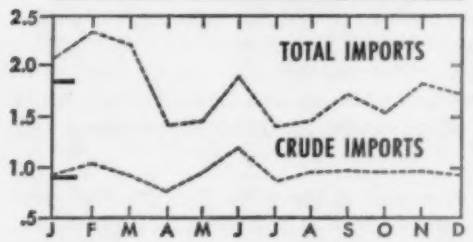


RUNS TO STILLS

Latest week	7.782
Previous week	7.922
Year ago	8.283

CRUDE PRODUCTION

Latest week	7.049
Previous week	7.153
Year ago	7.127

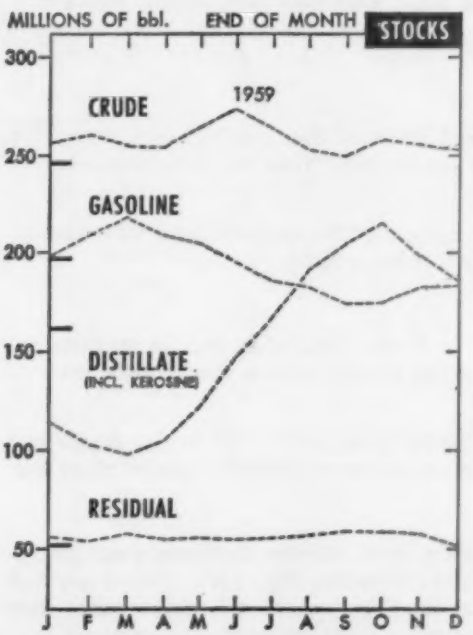


TOTAL IMPORTS

Latest week	1.766
Previous week	1.893
Year ago	1.738

CRUDE IMPORTS

Latest week	.875
Previous week	.967
Year ago	.805



CRUDE STOCKS

Week ended 3-5	252.7
Previous week	253.1
Year ago	256.0

GASOLINE

Latest week	221.1
Previous week	218.9
Year ago	210.3

DISTILLATES

Latest week	111.7
Previous week	122.1
Year ago	97.9

RESIDUAL

Latest week	43.2
Previous week	44.1
Year ago	55.0

Demand for domestic crude in April may be down 8% from last year, and about 5% under predicted demand for the current month.

That's the indication from the Bureau of Mines, which estimates demand at 6.5-million b/d. This compares with 6.9-million b/d forecast for March, and a demand of 7.1-million b/d last April.

Indicated demand for domestic crude in February was 7.2-million b/d, while production totaled 7.3-million b/d.

Crude runs of 7.4-million b/d are forecast for next month, down 666,000 b/d from February, and 441,000 b/d under April of last year.

But it's still anybody's guess whether the predicted lower runs will result in an appreciable drain on products stocks.

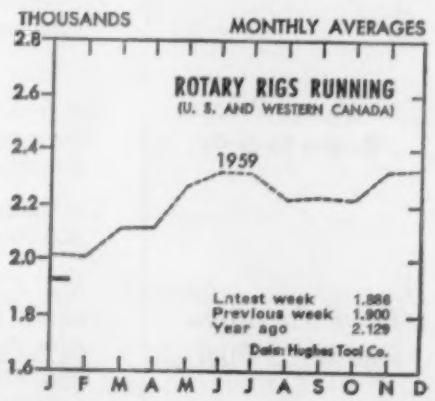
Gasoline demand for April is estimated at 4.3-million b/d, up 2.9% over last year.

From here on in, total demand will depend to a larger and larger extent on consumption of motor fuel, which reaches a peak in the summer.

But gasoline stocks hit a new high last week of 221.1-million bbl., up 2.2-million bbl. from a week earlier.

The current motor fuel stocks are 10.1-million bbl. over a year ago. And it can be expected that inventories will continue to increase until the end of March.

The cold weather so far in March is bringing distillates stocks down to more reasonable levels. Inventories declined 10.8-million bbl. last week, but they are still 13.8-million bbl. over last year.



The Market Trend

The Bigger the Sell, the Harder the Fall

"You can plot a graph that will tell in what year we'll be giving the stuff away." This was a marketer's sardonic reaction to oil prices paid by the military over the past 8½ years. They're an oil man's horror, but a taxpayer's delight.

The price trend in industry sales to the military has been steadily downward in recent years. In 1952, the U.S. military paid a weighted worldwide price of 18.37¢ a gal. for Grade 115/145 avgas. In the first half of 1960, this figure is running 15.76¢ a gal., or 2.61¢ below the 1952 price.

This fading price tendency is the same for most products the military buys. Average prices paid for Grade 100/130 avgas slipped from 16.82¢ in 1952 to 15.46¢ for the first half of 1960. In the same period, JP-4 fuel prices fell from 10.24¢ to 8.89¢. The price of motor gasoline was down from 11¢to 8.9¢.

This declining trend is actually much more severe than the figures alone indicate, for two hikes in U.S. crude prices have taken place since 1952. There was a general 25¢ boost in June, 1953. Later, in January, 1957, most prices were advanced from 25¢ to 35¢ a bbl.

So the squeeze on the refiner is apparent. His costs for whatever share of crude he has to buy have gone up over 1¢ a gal. His sales to the biggest customer in the world have slipped anywhere from 1.2¢ to 2.6¢ a gal.

Sales of incremental barrels to customers like the military, one major says, "are so attractive we can't resist them." Dumping product on the military (or on big private-branders, for that matter) involves no expense of building gasoline stations, no small deliveries, no bad debts. Therefore any price above a refiner's average cost of crude, including ownership crude, begins to look attractive.

The industry is leaving a lot of money on the table. Current purchases by the military are running over 700,000 b/d. If you have a comptometer, you can work out some staggering paper losses accruing from a philosophy of too much, too soon.

Quota News and Spot Prices:

The Interior Dept. assured the coal interests that residual imports quotas wouldn't be eased, and No. 6 prices for New York deliveries immediately went to a premium.

Buyers bid $2.15 a bbl. for either domestic fuel, or foreign oil with a quota attached. The prevailing contract price is $2.10.

Waco Prices Down to 5.9c:

The joke of the week took place in Waco, Tex., when service stations cut their retail prices down to 8.9¢ (ex taxes), with a special bulk price of 5.9¢ a gal.

The competition outside of town loaded their trucks with empty drums and filled up. It got so bad that some suppliers put Waco stations on allocation.

The Cold Wave And No. 2 Fuel:

The cold wave has helped drain off a lot of surplus distillate. Four companies showed up as buyers on the Plantation Pipe Line. Emergency rail shipments were being made into the Carolinas. New York suppliers were borrowing product to eke out supplies until the next cargo arrival.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of March 14

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- **Gasoline, 98 oct prem ..... 11.75↓-12.75↓**
- Gasoline, 92 oct reg 10.75-11.5
- Kerosine 9-10
- Heating oil, No. 2 8-9
- Gas oil, 48-52 d.i. 8.25-9
- Fuel oil, bunker "C" $2.00-2.10

Caribbean, cargoes
- Avgas, Grade 100/130 ..... 14.75
- Gasoline, 93 oct research prem 11
- Gasoline, 87 oct research reg 10.125
- Gasoline, 79 oct research 9.375
- Gasoline, 70-72 oct motor method 9.25
- Kerosine 9.25
- Heating oil, No. 2 8
- Gas oil, 48-52 d.i. 8.25
- Fuel oil, bunker "C" $2.00

New York Harbor, barges
- Kerosine 9.8-10.3
- Heating oil, No. 2 ..... 8.8-9.3
- Fuel oil, No. 6 ..... $2.37-2.47

Okla.-Group 3, northern shpt., bulk
- **Gasoline, 91 oct reg ..... 11.25↑-11.75↑**
- **Kerosine ..... 9.5↓-10.125**
- **Heating oil, No. 2 ..... 8.25↓-8.5↓**
- Fuel oil, No. 6 ..... $1.50-1.70

Chicago, bulk
- Gasoline, 91 oct reg 11-11.25
- Heating oil, No. 2 ..... 8.75-10.35
- Fuel oil, No. 6 high sulfur 7.15

Los Angeles, rack
- **Gasoline, 88 oct reg ..... 11.5↓-12.65**
- Diesel fuel, PS 200 ..... 7.75-11.25
- Light fuel, PS 300 ..... $2.80
- Heavy fuel, PS 400 ..... $2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3 ..... 4.5
- FOB Breckenridge, Tex. 4

LP-Gas
- Propane, Oklahoma (Group 3) 4.5-5
- Propane, Baton Rouge 5.625-5.875

Pennsylvania Lubes
- Bright stock, 25 p.t. 23
- 200 vis. neutral, 25 p.t. 27

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i. 25-26
- Neutral, solvent, 200-210 vis 21.5-22.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i. 25
- Neutral, solvent, 200 vis 21.5

Eastern Hemisphere

Singapore (Pulau Bukom) cargoes
- Avgas, grade 100/130 ..... 15.875
- Gasoline, 79 oct research 9.75
- Kerosine 10.625
- Gas oil, 48 d.i. minimum 9.875

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9 ..... $2.62-2.97
- North Dakota, 36.0-36.9 ..... 2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9 ..... 3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9 ..... 2.92-3.22
  - West Texas, sweet, 36.0-36.9 ..... 3.00
  - West Texas, N.M., inter., 36.0-36.9 ..... 2.93
  - West Texas, N.M., sour, 32.0-32.9 ..... 2.71
  - East Texas, flat 3.05-3.25
  - Mirando, 28.0-28.9 ..... 3.31
- Illinois Basin, flat 3.00
- Pennsylvania Grade, Bradford dist., flat 4.55
- California, Signal Hill, 21.0-21.9 ..... 2.32†
- North Louisiana-Arkansas, 36.0-36.9 ..... 2.77-3.02
- Wyoming, sweet, 36.0-36.9 ..... 2.85-2.90
- Wyoming, sour, 32.0-32.9 ..... 2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.) $2.38
- Leduc-Woodbend (Alta.) 2.53
- Redwater (Alta.) 2.42
- Steelman A (Sask.) 2.435
- Virden (Man.) 2.30

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 47.0-47.9, Tucupido $3.34
- San Joaquin, 41.0-41.9, Puerto la Cruz 3.10
- Oficina, 35.0-35.9, Puerto la Cruz 2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay 2.30
- Bachaquero, flat, Las Piedras 1.75-1.88
- Tarra, 38.0-38.9, San Lorenzo 2.83
- Lagunillas Heavy, flat, Las Piedras 2.10

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura $1.90
- Safaniya, 27.0-27.9, Ras Tanura 1.50
- Iran, 34.0-34.9, Bandar Mashur 1.86
- Iran, 34.0-34.9, Abadan 1.81
- Iraq, 35.0-35.9, Fao 1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi 1.67
- Qatar, 41.0-41.9, Umm Said 2.05
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud 1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud 1.38

Middle East, Eastern Mediterranean
- Arabia, 34.0-34.9, Sidon $2.27
- Iraq, 36.0-36.9, Tripoli, Banias 2.31

Far East, Cargoes FOB Lutong, Sarawak
- Seria Light, flat $2.57

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- U. S. Gulf-New York, clean ..... (USMC—23%) $2.19
- **U. S. Gulf-New York, dirty (USMC—27½%) $2.07↓**
- **NWI-USNH, dirty ..... (USMC—60%) $1.10↑**
- NWI-UK/Cont., dirty ..... (Scale—57½%) 13/11*
- **Persian Gulf-UK/Cont., dirty (Scale—60%) 25/9*↓**
- **Persian Gulf-USNH, dirty .... (USMC—70%) $3.81**

**Sterling*

DEPT/Marketing

Tidewater Pushes East Coast Expansion

Tidewater Oil Co. is actively pursuing a campaign of expansion on the East Coast, which has already considerably strengthened and enlarged its retail market.

It has been reinforcing the legal fences around its present market by purchasing its own distributors, whenever they indicate their readiness to retire. This picking of ripe plums before they fall into the hands of competitors has lessened the vulnerability that once permeated much of the company's East Coast market.

Tidewater has also been maneuvering into the backyards of other suppliers to purchase competing distributors.

Its most recent acquisitions have been plucked from the territory of Phillips Petroleum Co., a company that just a few years ago seemed to have expansion plans of its own on the East Coast. Many marketers had expected Phillips' drive to carry it all the way to New York and New England (PW—Jul.15'55,p32).

Other suppliers that since 1957 have lost out to Tidewater in the bitter struggle for marketing outlets have included American Oil Co. (three distributors), Mobil Oil Co. (two), and California Oil Co., Cities Service Oil Co., Shell Oil Co., Sinclair Refining Co., and Texaco Inc. (all one each).

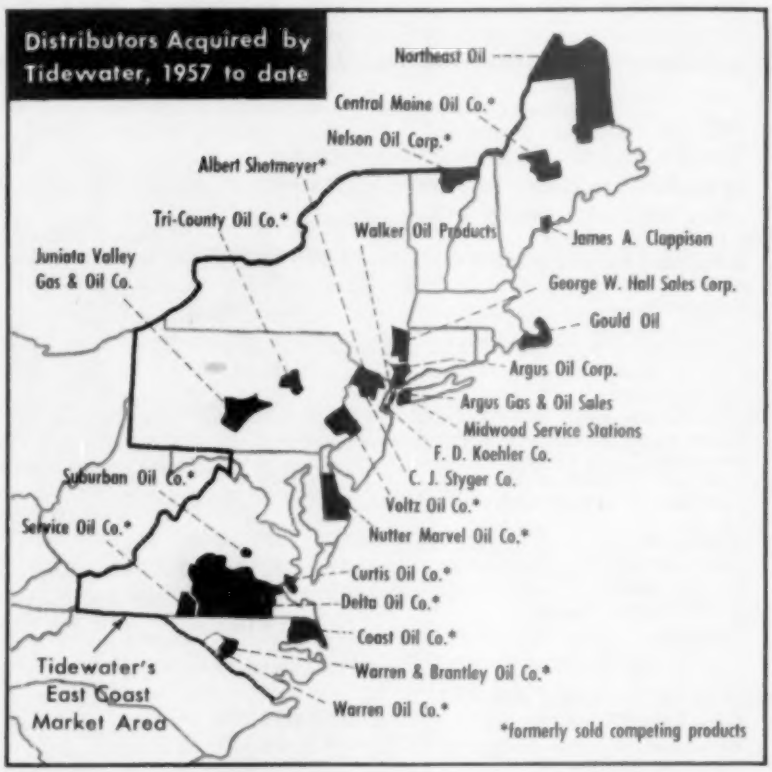
One marketer who lost distribution to Tidewater told PETROLEUM WEEK that he had long expected the company to "shake itself out of its lethargy and begin expanding. For years," he said, "they lost ground in New England, and they're just beginning to catch up."

Another marketer, who also lost a jobber to Tidewater, said, "At the prices they're paying for new distributors they can have them. We couldn't make a profit if we bought out our own distributors at those prices."

Tidewater has mainly been marching into the South, purchasing competing distributors in Virginia and in North Carolina.

This month, Tidewater announced that it had acquired three more distributors in North Carolina: Warren & Brantley Oil Co., which operated in Spring Hope; Warren & Brantley Oil Co. of Rocky Mount; and Warren Oil Co., which marketed in Louisburg.

These purchases brought 50 new dealer and commercial accounts to Tidewater, in addition to 650 new consumer and farm accounts.



Tidewater's first invasion of North Carolina occurred only five months ago—in October—when the company purchased Coast Oil Co., Elizabeth City, a former Phillips jobber. Through the purchase, Tidewater gained more than 50 commercial and farm accounts and 25 dealer outlets in a popular Atlantic resort region.

On October 1, Tidewater had added impressively to its Virginia market, when it raised its Flying A sign over the properties of Delta Oil Co., another former Phillips distributor with 30 years of marketing experience.

With this move, Tidewater picked up 28 service stations, nearly 100 dealer outlets, and "hundreds of commercial and farm accounts."

Spadework for further expansion into the South is being done in South Norfolk, Va., where Tidewater has just begun the construction of a marine terminal.

When it is completed this fall, the terminal will expand the company's base of operations and broaden its potential expansion in the South.

The terminal will have an initial capacity of 100,000 bbl.

The momentum of Tidewater's drive to the South shows no signs of letting up.

PETROLEUM WEEK has learned that the company plans to "develop" its newly acquired markets in North Carolina and Virginia, but still will be looking deeper South for further expansion.

A spokesman says that Tidewater will probably extend its market in North Carolina and eventually move into South Carolina. But there's nothing to prevent the company from skipping over South Carolina, and purchasing properties in Georgia.

Tidewater has also been busy preparing itself for an expected marketing boom on Staten Island, one of New York City's five boroughs.

The proposed Varranzano-Narrows bridge, which will connect the island with Brooklyn, will trigger a housing boom that will be a great stimulant to demand, Tidewater believes.

Tidewater is already in on the ground floor of Staten Island's heating oil market. Last summer, it became the dominant heating oil marketer on the borough with the purchase of F. D. Koehler Co.

Tidewater can also be expected to

pursue expansion possibilities in New Jersey, where it is still smarting from the loss of Solar Oil Co., Passaic County. Last summer, this former Tidewater jobber switched to Sun Oil Co.

In developing new markets, Tidewater has found that consignment distributors offer definite advantages over direct company distribution.

Especially in markets where Tidewater is a stranger, the newly appointed consignee can bring to the company's new operations a broad familiarity with local marketing conditions.

Very often he can help Tidewater secure favorable terms in new property transactions.

Furthermore, the consignee is generally more familiar with the local labor market than Tidewater, and also may be better able to expand sales through community recognition.

Tidewater's mushrooming growth in marketing facilities began as far back as 1954. In that year, the company developed its present grand strategy for expansion.

One sign of the emergence of the new order was the change in the company's financial policy. After paying dividends regularly on common stock for years, the company abruptly closed the door on additional cash dividends.

Stockholders were told that it would be some time before cash dividends would be paid again.

In 1954, also, Tidewater announced plans for its Delaware refinery. The Delaware location was chosen in part because it gave the company a central position for southward expansion, without creating supply problems in the North.

Then, the company set about building up its marketing plant. In 1954, an expansion drive began, which has resulted in a total of 1,200 new service stations.

But all this has cost money—much more money than Tidewater has been able to finance out of internal operations.

By 1956, marketing expenditures had leaped from a normal $5.1-million in 1954 to $23.6-million. Since then Tidewater has been investing in marketing at the rate of $20-million or more a year.

To finance all this, Tidewater has had to make unprecedented trips to the capital markets. In 1956, the company borrowed $160.1-million in long-term funds, and last year it was still borrowing money at the rate of $15.4-million over the first nine months of the year.

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Esso Offers Oil Burner Service Plan

The Esso Standard Division of Humble Oil & Refining Co. is offering its heating efficiency program—HEP—to the industry. The program has proved itself in saving potential gas customers for oil.

HEP, developed by Esso Research & Engineering Co., is a new approach to oil burner servicing. Through the program, Esso has shown that consumers can save an average of 390 gal. of fuel a year, or about 20% of their annual fuel costs.

In Newark, N.J., where Esso pilot-tested HEP, the company found that half the consumers in the test who were on the point of converting to gas heat decided to stay with oil after they had experienced the benefits of the program.

Esso developed the program because it felt that too many oil burners in operation today are inefficient, smoky, and difficult to regulate.

Oil heat customers agreed, Esso found. Of 1,000 letters that Esso sent out, announcing its methods for improving efficiency, 370 replies were received—a "phenomenal" return.

Of the 242 consumers whose heating problems lent themselves to HEP correction, 130 (or 54%) accepted the program.

"Where savings were small, only a few customers bought the modifications," says Charles F. Blood, Esso's assistant manager of fuel oil sales.

"As savings increased, so did sales, up to the point where, with $100 savings, everyone bought the job," he told the National Fueloil Council last week at its second promotional conference, in Atlantic City.

Oil heat marketers who adopt the program will be able to step up the efficiencies of their customers' heating equipment, in addition to producing cleaner operation, Esso says.

In its test, Esso increased the average efficiency of heating equipment from 64.4% to 79.7%. These improvements were achieved by reducing the firing rates of the equipment and increasing their turbulence.

This combination of modifications also reduced stack temperatures, cut down on smoke, and produced a hotter fire.

In the Newark test, 82% of the customers who had their burners modified said their homes had become more comfortable as a result. And 72% said the morning pickup of their burners was just as quick as or quicker than before the adoption of HEP, despite reduced firing rates.

The cost of the program to consumers ranged from $35 to $116; annual savings were expected to range from $21 to $224.

At these rates, Esso itself was able to make a profit on HEP.

By Apr. 1, Esso will make available films and speakers to educate oil marketers on the use of its heating efficiency program.

In addition, Esso will offer its engineering manual (at nominal cost) to oil marketers. This manual contains all the mathematical formulae and computations used in installing the program.

What's New / IN MARKETING

Motorists often suffer guilt feelings when they fail to change their motor oil frequently.

By probing into the public's mind, Jones, Brakely & Rockwell has also discoverd that motorists are paralyzed by the conflicting oil-change recommendations they hear from carmakers, service station attendants, and oil companies.

Jones, Brakley & Rockwell, a public relations firm hired last December by API's Motor Oil Study Panel, is conducting 100 depth interviews to analyze the public's confusion on motor oil changes.

Thus far, the firm also has learned that a distressing number of motorists are unaware that drain-interval recommendations even exist. And one peevish driver complained that with a little adjustment in his engine he could lubricate it with water. Lubricants, he said, are just a gimmick thought up to sell more oil.

Jones, Brakely & Rockwell will give a final report on its study in May, at the Bedford Springs (Pa.) meeting of the API Lubrication Committee.

•

Standard Oil Co. of California, Western Operations, Inc. reports that more than 95% of its Chevron dealers have signed the company's controversial, three-year lease (PW—Jan.15'60,p42). The company said last week that the protests that many dealers had originally voiced against the lease were apparently based largely on rumors.

Innovations in the new lease include a 10% rental override on gross profit from sales of merchandise not supplied by Standard and a 50% override on parking profits.

These are mainly bookkeeping changes, says Standard, and most dealers do not find any change in their basic relationship with Standard under the lease.

•

Engineering

A machine that dispenses trading stamps for service station dealers has been introduced by Stamp Audit Co., of Glendale, Calif.

The machine, priced under $100, automatically counts and dispenses stamps, thereby speeding up customer traffic and assuring correct distribution. Counters provide perpetual inventory of the stamps.

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DEPT/Personals

W. DOW HAMM becomes vice-president and general manager of crude oil production for Atlantic Refining Co., Philadelphia. He succeeds **Laurence A. Sunkel**, vice-president and a director, who will devote his attention to special crude oil production activities until his retirement next year. Hamm has been manager of domestic and foreign exploration since 1952.

W. D. Hamm

W. D. Seyfried

W. D. SEYFRIED has been appointed to the newly created position of manager of research, and **Dr. H. Dayton Wilde** to the newly created position of university relations counselor, for Humble Oil & Refining Co., Houston. Seyfried, who has been serving as head of Humble's research and development division at the Baytown (Tex.) refinery, will be responsible for coordination of Humble's scientific research. He will also advise the company's board on available research programs, and evaluate research results in the light of the company's needs and objectives. Wilde has been serving as research coordinator of the Humble Division. In his new position, he will be responsible for fostering good relations with the colleges and universities from which Humble recruits many of its new employees.

FRED C. HIGGINBOTHAM, JR., and **JAMES S. CLEAVER** have been elected vice-presidents of General American Oil Co., Dallas. Higginbotham, who was formerly assistant secretary-treasurer, continues as controller; Cleaver has been assistant to the president. Two new directors and executive committee members are **W. Lewis Perryman, Jr.**, executive vice-president and general counsel, and **Frederick H. Connally**, vice-president and treasurer.

GEN. ERNEST O. THOMPSON has been renamed chairman of the legal committee of the Interstate Oil Compact Commission by **Gov. George Docking**, Kansas, commission chairman. Thompson is presently chairman of the Texas Railroad Commission, and has served three times as chairman of IOCC.

J. L. MINNER has been elected chairman of the National Fuels Council, and **William F. Kenny, Jr.** is the vice-chairman. Minner is manager of Shell Oil Co.'s fuel oil department, in New York, and Kenny is president of Meenan Oil Co., New York. **D. L. Barrett**, Esso Standard Division of Humble Oil & Refining Co., formerly chairman of the council, and **Wiley Butler**, Coastal Oil Co., formerly vice-president, continue to serve on the council's board.

ALBERT BENJAMIN has been named director of public relations for Texaco Inc., New York. He was formerly manager of the public relations department's Latin American division, in Caracas, Venezuela. Benjamin succeeds **Thomas D. Durrance**, who has been named manager of public relations for Arabian American Oil Co.

A. Benjamin

C. Slack

CARSTENS SLACK becomes manager of Phillips Petroleum Co.'s office in Washington, D. C. Slack, who was formerly manager of the company's public relations division at Bartlesville, Okla., succeeds the late **E. D. McElvain.**

BYRON E. MILNER is the new manager of Atlantic Refining Co.'s Atreco refinery, at Port Arthur, Tex., and Albert W. Kusch succeeds him as general superintendent of the Atreco plant. Milner succeeds **Paul L. Robison**, who is retiring. Kusch, who joined Atlantic in 1941, was named technical assistant to the manager of the Port Arthur refinery last year. Milner, who joined Atlantic at the Philadelphia refinery in 1939, transferred to the Port Arthur refinery in 1956.

B. E. Milner

H. L. Cavanagh

HARRY L. CAVANAGH becomes manager of the Ioco (B.C.) refinery of Imperial Oil, Ltd., succeeding **A. G. Stewart**, who is now manager of the company's Regina refinery. Cavanagh has been Ioco plant superintendent since 1956. **Stan V. Antenbring**, formerly in the engineering division of the Sarnia refinery, succeeds Cavanagh at Ioco.

JACK P. ROBBINS, Skinner Corp., San Antonio, received the API Meritorious Service Award this week, at the Southern District meeting of the API division of production. Robbins was honored for his outstanding service to the API Southwest Texas chapter, particularly as chapter chairman in 1957 and 1958. At the same meeting, four API Citations for Service were given to **C. H. Taylor**, Shell Oil Co., Houston; **Ben F. Carter**, Union Producing Co., Shreveport; **Roy A. Bobo**, Southeastern Drilling Co., formerly in Houston but now in Argentina; and **T. W. Keating**, formerly with Pan American Petroleum Corp., in Houston, and now a resident of Dallas. Taylor's award is in recognition of his service as national chairman since 1956 of the API committee on standardization of oilfield valves and fittings, and Carter's award acknowledges his leadership as district chairman in 1958. The award to Bobo is for conspicuous service as district chairman in 1959. Keating received the Citation for Service for his contribution in 1958 as chairman of the district drilling practice committee.

GEORGE CORMACK is the new Calgary division production superintendent for Shell Oil Co. of Canada, Ltd., succeeding **L. E. Wichmann**, who has retired. Cormack, who has been with the Shell organization since 1947, has been involved in its drilling operations in Western Canada and Colombia.

G. Cormack

H. H. Beeson

HENRY H. BEESON moves up to the newly created position of natural gas coordinator for Mobil Oil Co., with offices in Dallas. He will coordinate gas contract and policy matters among the company's exploration and producing divisions located at Houston, Midland, Denver, and Los Angeles. Beeson will also be in charge of the company's relationships with the Federal Power Commission, and will administer the negotiations of all gas sales and gas purchase contracts. Beeson joined the Mobil organization in 1946 as assistant manager of Magnolia Petroleum Co.'s natural gas department, and was named manager of that department last Spring. When Magnolia Petroleum was combined with the Mobil organization late last year, Beeson became natural gas manager for the Houston exploration and producing division.

DEPT/Service & Equipment Companies

W. P. Hettinger, Jr. J. W. Ryznar

DR. JOHN W. RYZNAR, vice-president and technical director of Nalco Chemical Co., Chicago, has been promoted to the new position of technical representative in corporate management, and **DR. WILLIAM P. HETTINGER, JR.,** to director of research for the company. Ryznar will be responsible for planning, guiding, and coordinatng all technical activities for the company and its subsidiaries. He joined Nalco in 1937, and was named technical director in 1950, and vice-president in 1957. Hettinger will continue to coordinate research activity for Nalco's Catalyst division. He has been head of research for that division since he joined the company in 1957.

GORDON W. WALKER, manager of the pipeline division of Mannix Co., Ltd., Calgary, has been elected president of the Pipe Line Contractors Assn. of Canada, succeeding D'Arcy J. Baldwin. Other new executives of the association are: **W. Douglas Porter,** Toronto, vice-president and general manager of Mid-Canada Contractors, Ltd., first vice-president; **W. A. Rose,** Toronto, president of Magestic Contractors, Ltd., second vice-president; and **George A. Wilkinson,** Vancouver, vice-president of Marwell Construction, Ltd., treasurer

DR. ADALBERT FARKAS has been named assistant director of research for Houdry Process Corp., Philadelphia. He joined Houdry in 1956, and most recently headed the organic research section, which developed Houdry's new catalyst, Dabco, used in the production of polyurethane foams. Farkas has also been associated with Union Oil Co. of California, and the Barrett division of Allied Chemical Corp.

ED NEELY becomes sales engineer for the oil tools department of Avondale Marine Ways, Inc., with offices in Harvey, La. Avondale's oil tools department specializes in the repair of oil drilling equipment. Neely has been associated with Hydril Co., Sutorbilt Corp., Marshall, Neil & Pauley, Inc., and Southern Engine & Pump Co.

MAJ. GEN. WILLIAM M. CREASY, (USA, ret.), vice-president of The Lummus Co., has been appointed manager of its New York division. At the same time, **Dr. S. Z. Avedikian** joins the company as acting director of its engineering development center, in Newark, N.J. He succeeds Creasy, who was formerly director of the center. Avedikian was co-founder of Avedikian & Co. in 1932, Tidings Corp. in 1947, and S. Z. Avedikian & Associates in 1959. He has been engaged in the research and development of processes and products for 25 years.

RALPH A. DORA has been appointed to the industrial gas chromatography group in the scientific and process instruments division of Beckman Instruments, Inc., Fullerton, Calif. He has been a senior technician with Benson-Lehner Corp., and an instrumentation engineer with Shell Development Co.

V. Armstrong, Jr. F. M. Morris

F. M. MORRIS becomes vice-president, and **VESPER ARMSTRONG, JR.,** succeeds him as secretary-treasurer, of Longhorn Supply Co., Houston. At the same time, **Mrs. Geraldine F. Irwin** becomes assistant to Armstrong. Morris, who joined Longhorn in 1947, became general manager in 1955; he has been secretary-treasurer since 1958. Armstrong, a certified public accountant, was associated with Ernst & Ernst, Houston public accountants, before he joined Longhorn a short time ago.

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JAMES E. McDONALD is the new manager of mechanical and pressure tubing products for United States Steel Corp.'s National Tube division, Pittsburgh. He joined the division in 1946, and became a sales trainee in 1948. He has been in the division's Pittsburgh sales office since 1953.

J. E. McDonald

R. B. McCannon

R. B. (Cocky) McCANNON moves up to Northern California district manager for Baker Oil Tools, Inc. He succeeds **Aaron A. Baker,** who will devote his time to his duties as a director of the company, and as sales engineer in Coalinga, Calif. McCannon, who has been with Baker for nearly 30 years, has been located in California, except for a few months in Venezuela in 1949 as export service engineer. He was most recently branch manager in Bakersfield. The Northern California district headquarters have been moved to Bakersfield, and the Taft branch will now be included in this district, along with Colusa and Coalinga.

LUTHER M. MILLER, K. E. CURTIS, and **G. M. GAVIOTIS** are managers of three new districts in National Supply Co.'s northwest division. Miller is in charge of the northern district, at Billings, Mont., which includes supply stores at Williston and Charlson, N. D., Glendive and Kevin, Mont., and Worland, Wyo. Curtis will be located at Casper, Wyo., where he will be responsible for the central district, including a store and used equipment yard at Casper and stores at Newcastle, Wyo., Sidney and Kimball, Neb., and Ft. Morgan, Colo. Gaviotis is southern district manager, with offices in Farmington, N. M. That district includes a store and used equipment yard at Farmington, and stores at Cortez and Craig, Colo., and Rock Springs, Wyo.

JIM BLANE moves up to Rocky Mountain district manager of Franklin Supply Co., with offices in Denver. Blane, who has been manager of the Denver branch, will be in charge of operations in Colorado, Nebraska, Wyoming, Montana, and northern Utah. **Malcolm Sublett** transfers to Casper, Wyo., as manager of that area. He was formerly manager of purchases in the Denver office. **Randy Shortt,** formerly field salesman in the Oklahoma City office, succeeds Sublett in Denver. **Frank Nichols** moves up to assistant store manager of the Denver office. He has been an inside salesman in the Denver office since joining Franklin in 1958. **Kenneth (Skip) Blessing,** with Franklin since 1955, has been named assistant manager of purchases at the Houston branch.

R. D. (Don) HULL is the new manager of engineering for Pipe Line Technologists, Inc., Houston. He joined the company in 1957, and has assisted in engineering work on projects in Venezuela, Alaska, Canada, and the United States. He has also been a gas engineer for Sun Oil Co., in Dallas.

ZEB LAND is the new sales representative at Electra, Tex., for Bradford Motor Works. He was formerly a field representative for National Supply Co., in Pampa, Tex.

HOWARD McDONALD joins Industrial Supply Co. as store manager of the Electra (Tex.) branch. He was formerly district field representative for Fluid Packed Pump Co. in the Electra area.

ALAN E. RIEDEL has joined Cooper-Bessemer Corp., Mt. Vernon, Ohio, as general attorney, reporting to **S. E. Johnson, Jr.,** company secretary and manager of industrial relations. Riedel was formerly associated with Squire, Sanders & Dempsey, Cleveland law firm.

A. E. Riedel

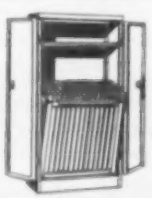
W. E. Esslinger

W. E. (Bill) ESSLINGER has been named sales manager for Skinner Bros. Co., Dallas-Tulsa oilfield equipment manufacturer. He was sales manager for Hale Mfg. Co., before joining Skinner. He has also been manager of National Supply Co.'s outlet in Madison, Kan.

DOMINION OILFIELDS SUPPLY CO., LTD., Calgary, is the new Canadian distributor for National Supply Co. products. The company will handle National's full line of oilfield machinery and equipment, together with certain products of other manufacturers that are used with National equipment. Dominion distribution will be in addition to that through National Supply Co., Ltd., which also has headquarters in Calgary.

MARCEL L. VALOIS becomes industrial sales representative in the Baton Rouge area for Napko Corp., Houston industrial coatings and paint manufacturer. Before joining Napko last year, Valois was factory representative for a company specializing in coatings for customers in the Gulf Coast area.

R. R. SHOURD moves up from location manager at Wichita Falls, Tex., to Pacific division sales manager at Bakersfield, Calif., for Schlumberger Well Surveying Corp. **B. M. Ray** moves to the Kansas division, at Wichita, as senior sales engineer. He was formerly location manager at Perryton, Tex. **H. C. Thomason,** formerly senior sales engineer in the Kansas division, succeeds Ray at Perryton. **R. D. Knapp** and **P. E. Sapaugh,** formerly field engineers general, have been named sales engineers. Knapp will remain at Andrews, Tex., and Sapaugh at Tyler, Tex.

MAP  FILE

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P	1,000,000 ft. 4"...10.50¢		P
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Foresight, not Hindsight, Is Best

THE CALM, REASSURING WORDS that Oil Imports Administrator Matthew V. Carson, Jr., used in Canada last week should do much to smooth some ruffled feathers and mollify the uneasy feelings of oil men on both sides of the international border.

They were encouraging and optimistic in their long-range view. Yet they also were tinged with disappointment for Canadian oil men, for, in effect, they amounted to a soft suggestion that our northern neighbors take it easy in implementing the expansion and marketing goals of the Borden Commission report. It was this report that laid heavy stress on U. S. markets as prime targets for Canadian petroleum surpluses and growth objectives.

Carson, speaking at the Canadian Petroleum Assn.'s annual meeting, made no direct mention of the Borden energy study findings. But there could be little doubt that it was uppermost in his mind in urging the Canadian oil men to use patience and restraint.

EVERYONE HAS SURPLUS AND GROWTH PROBLEMS, he noted, and everyone is looking avidly for outlets. But a sudden and significant displacement of domestic crude in the northern states by oil produced in Saskatchewan and Alberta, without regard to its probable effect on production activities in this country, could only have unhappy results.

The long-range view is that growth is inevitable on both sides of the border, and that both nations should share in it. But, he cautioned, let us not embark on undertakings that might look attractive from a short-range view, only to learn that our long-term prospects have been hampered. In other words, if the U. S. and Canadian industries are to have an enduring and happy marriage, each side will have to be considerate of the well-being of the other.

It makes sense, doesn't it?

Virginians Show It Can Be Done

VIRGINIA DEALERS ARE PROVING that "ex tax" gasoline sales can be a mighty powerful weapon in the war on gasoline taxes. It was a courageous step that these dealers took, but the results are worth it. Many motorists, for the first time, have been awakened to the insidious extent of gasoline taxes.

PETROLEUM WEEK has urged an approach like this before, and, like the Virginians, we hope the idea spreads to other states. It can't help but put a lid on further tax increases.

Big profits wait here for the marketer offering quality lubes and fast service

A big source of profits for the independent oil marketer is the highway and building-construction market. And a big share of this lubricant business goes to the man who offers top-quality products and on-the-site service to contractors.

Sun can help you in two ways:

1. The Sun line of top-quality lubricants can assure you the respect of contractors who want top-quality products to protect their valuable earth-moving equipment.

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BUT REMEMBER—the products you offer must be right. Let us show you *how* right the Sun line is for your continued success. Write for full details to General Wholesale Department, SUN OIL COMPANY, 1608 Walnut Street, Philadelphia 3, Pennsylvania. In Canada: Sun Oil Company Limited, Toronto and Montreal.

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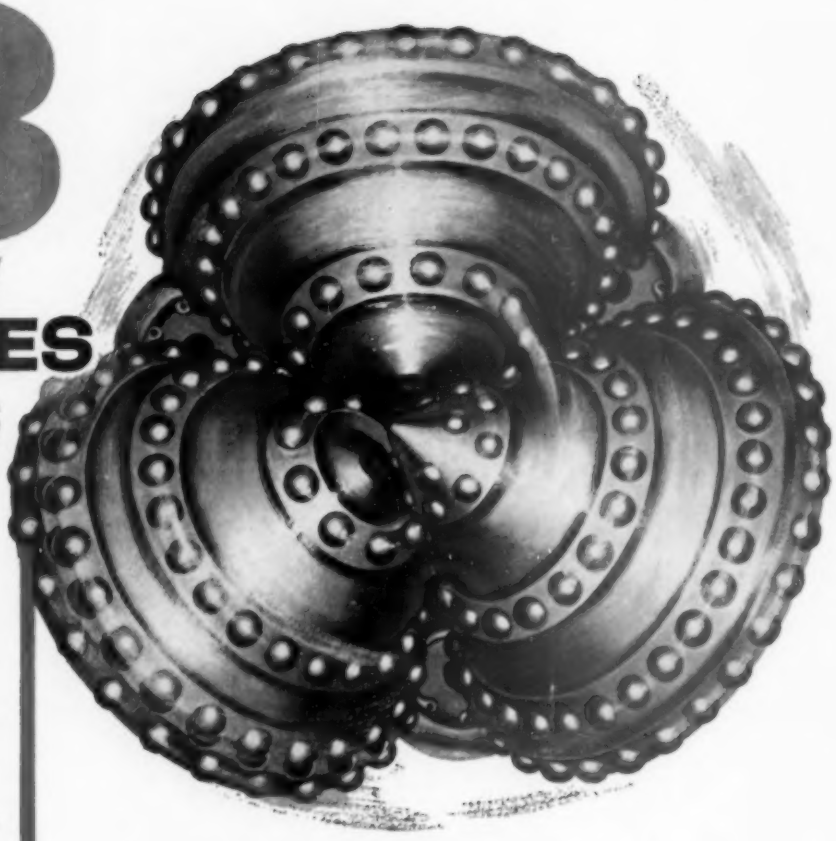
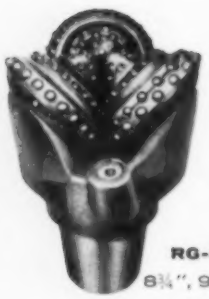
3 New HUGHES bits



RG-7J
8¾"

RG-1J
6" – 9"



RG-2BJ
8¾", 9", 9⅞"

...cut hole time in hardest digging

Footage and penetration rate are being substantially increased with the three new Hugheset bits, pictured here. They are expanding the range of formations that can be advantageously drilled by R Series bits. The three new Hugheset bits have been designed to drill specific segments of hard formations. All three are fortified on the gage surfaces with sintered tungsten carbide compacts to minimize wear and assure full gage hole.

1. RG-7J is designed to drill the weaker or softer segment of hard formations (lime, dolomite and hard sandy shale). Design of the bit assures more action on bottom and faster penetration. Deeper intermesh, wide spacing of the compacts, and interruptions of the lands make it possible for the RG-7J to more economically drill formations previously drilled by hard formation milled-cutter bits and R-1 bits.

2. RG-1J, which replaces the R-1, R-1J and RG-1, is designed to drill the medium range of hard formations which normally are very abrasive. Because of its fortified gage, RG-1J performance in these formations is outstanding.

3. RG-2BJ – identified by spearpoints on each of the three cones – has larger diameter compacts and a maximum number of compacts on all rows and on the gage surfaces. It is the most rugged of the R Series bits. It is designed to drill the hardest of hard abrasive formations, such as quartzite and hard quartzitic sands.

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